

SBIR / STTR FISCAL YEAR 2009 PHASE I AWARDS

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TOPIC: TECHNOLOGY TO SUPPORT BES USER FACILITIES

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Company:

RadiaBeam Technologies, LLC
13428 Beach Avenue
Marina Del Rey, CA 90292-5624

Title:

A High-Resolution Transverse Diagnostic Based on Fiber Optics

Summary:

This project will develop a new means of measuring the properties of state-of-the-art electron beams with radiation hardened fiber optics. Knowledge of these properties is critical to successful operation of the facilities that produce these beams. These facilities are widely used to probe the nature of matter in virtually all fields of science and technology.

Company:

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title:

Bright Quantum Dot Scintillator for High Frame Rate Imaging

Summary:

This project will develop a scintillator that will allow exploitation of the potential of current state-of-the-art X-ray detectors used for synchrotron applications, medical imaging, X-ray scanning equipment at airports and border control and detectors for homeland security, and in small animal research, which is so important for the development of new drugs in a rapid and cost-effective manner.

Company:

Ultramet
12173 Montague Street
Pacoima, CA 91331

Title:

Foam Core Structure for Protective Gas Film Formation in High-Power Mercury Spallation Targets

Summary:

By adapting advanced rocket thruster technology, this project will create a representative mercury spallation target that will help enable full power use of the SNS at Oak Ridge National Laboratory. The research then made possible by the fully functioning SNS will spur considerable advancements in materials science, medicine, and industry.

TOPIC: RADIO FREQUENCY (RF) DEVICES AND COMPONENTS FOR ACCELERATOR FACILITIES

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Company:

Beam Power Technology, Inc.
5 Rolling Green Lane
Chelmsford, MA 01824

Title:

Design Studies of Megawatt-Class Continuous-Wave Elliptic-Beam Inductive Output Tubes

Summary:

This project will develop megawatts-class highpower, high-efficiency elliptic-beam inductive output tubes (EBIOTs) for accelerator applications.

Company:

Beam Power Technology, Inc.
5 Rolling Green Lane
Chelmsford, MA 01824

Title:

Development of a 100 kW 2.815 GHz Continuous-Wave Elliptic Beam Klystron with Two Output Windows

Summary:

This project will develop a high-efficiency, low-voltage elliptic-beam klystron to reduce costs of operating accelerators for basic energy science research.

Company:

Beam Power Technology, Inc.
5 Rolling Green Lane
Chelmsford, MA 01824

Title:

Development of a Pulsed, 10% Duty 140 kW, 402.5 MHz Elliptic-Beam Inductive Output Tube

Summary:

This project will develop a new class of energy efficient, higher power, lower cost inductive output tubes. IOTs are used in areas such as leading edge scientific research and digital TV broadcasting where high power rf amplification is required.

Company:

DULY Research Inc.
1912 MacArthur Street
Rancho Palos Verdes, CA 90275-1111

Title:

RF Coupler Controllable with a Fluid Circuit

Summary:

This project will develop a fluid controlled, tunable RF coupler for both normal conducting and superconducting RF cavities. This is an important innovation in the fields of RF accelerators and power sources.

Company:

Green Mountain Radio Research Company
77 Vermont Avenue
Colchester, VT 05446

Title:

Development of High-Efficiency Power Amplifiers for 350 - 500 MHz

Summary:

Accelerators used by DOE for nuclear-physics research require huge amounts of electrical power. The project will develop high-efficiency power amplifiers that will significantly reduce electricity consumption, thus reducing operating costs, importation of foreign petroleum, pollution, and greenhouse-gas emissions.

TOPIC: ADVANCED SOURCES FOR ACCELERATOR FACILITIES

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Company:

Advanced Energy Systems, Inc.
27 Industrial Blvd, Unit E
Medford, NY 11763-2286

Title:

Advanced High-Brightness Electron Source

Summary:

This project will develop an advanced electron source suitable for driving the next generation of light sources for research, imaging and industrial processing, that will keep the US at the forefront of the important science that will be performed and the spin-off applications that will be developed from that science.

Company:

Electrodynamic
4909 Paseo Del Norte NE
Albuquerque, NM 87113-1527

Title:

Pulse Resonance for Photoelectron Acceleration

Summary:

Accelerator system performance is limited by the high power requirements, low duty cycle, and low repetition rate, of electron guns that can produce a brief electron pulse in a 10-100MV/m environment. This project will create a novel electron gun combining this pulse resonator technology with laser and photocathode technologies.

STTR Project**Company:**

Muons, Inc.
552 N. Batavia Avenue
Batavia, IL 60510

Title:

Improved DC Gun Insulator Assembly

Summary:

Ceramics with specific changes in resistivity throughout their volume will be developed and manufactured to improve very high voltage gradients in DC guns used for accelerator research and industrial applications.

STTR Project**Company:**

Muons, Inc.
552 N. Batavia Avenue
Batavia, IL 60510

Title:

H-Ion Sources for High Intensity Proton Drivers

Summary:

A device to produce H⁻ ions, which are each made up of a proton and two electrons, is being developed to enable higher intensity beams with better reliability and improved efficiency for many powerful particle accelerators used in science, industry, and homeland defense.

Company:

RadiaBeam Technologies, LLC
13428 Beach Avenue
Marina Del Rey, CA 90292-5624

Title:

Development of a CW NCRF Photoinjector Using Solid Freeform Fabrication (SFF)

Summary:

This project will develop a high average power electron gun manufactured with innovative, cost cutting, techniques. This promises to be a key enabling technology for imaging and analysis applications of interest to homeland security as well as industrial and academic programs.

Company:

Rivis, Inc.
8100 Brownleigh Drive
Suite 120
Raleigh, NC 27617

Title:

Back-Gate Field Emission-Based Cathode RF Electron Gun

Summary:

This project will develop high electron current sources for the Department of Energy. The use of high frequency radio waves to extract the electrons allows the electron sources to be incorporated into electron guns that are needed for high energy accelerators used by the DOE for basic research and electron microscopes to image the materials at near atomic resolution, for example.

Company:

SupraMagnetics, Inc.
214 Canal Street
Plantsville, CT 06479

Title:

Extrudable NbTi Superconductor with Ferromagnetic Pins for Undulator Magnets

Summary:

A new economical NbTi superconductor with advanced performance will be developed for undulator magnets, MRI, and NMR instruments for the general benefit of the public.

TOPIC: ANCILLARY TECHNOLOGIES FOR ACCELERATOR FACILITIES

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Company:

Boulder Precision Electro-Optics
3049 Redstone Lane
Boulder, CO 80305

Title:

A Laser Power-Build-Up System for H Atom Ionization

Summary:

A resonant cavity multiplies up light power in a recycling process to a power level at which it can efficiently promote Hydrogen atoms into excited states. The purpose of this is to allow subsequent removal of the electron so the proton can be injected into a proton accelerator.

STTR Project**Company:**

Kapteyn-Murnane Laboratories, Inc.
1855 South 57th Court
Boulder, CO 80301

Title:

Convert 1um Ultrafast Fiber Laser to 2um, and Pulses Less than 100Fs

Summary:

This project solves difficult problem on a critical piece of equipment for the next generation of free electron lasers. These systems are crucial to generating high brightness light sources for studies in chemistry, biology, and medicine.

STTR Project**Company:**

Muons, Inc.
552 N. Batavia Avenue
Batavia, IL 60510

Title:

High Power Co-Axial SRF Coupler

Summary:

Co-axial window technology is being improved with new materials and techniques in order to transfer RF power from sources to RF cavities at very high levels to satisfy the demands of intense light sources used for science and industry.

Company:

Muons, Inc.
552 N. Batavia Avenue
Batavia, IL 60510

Title:

Beam Pipe HOM Absorber for 750 MHz RF Cavity Systems

Summary:

Superconducting RF cavity systems will be improved by developing better designs and materials for the absorption of unwanted higher order mode (HOM) frequencies that lead to beam instabilities in synchrotron light sources.

Company:

Q-Peak, Incorporated
135 South Road
Bedford, MA 01730-2307

Title:

Temporal Pulse Shaping Techniques for Photo-injector Lasers

Summary:

Fundamental studies in biology, materials science, chemistry, and physics will greatly benefit from the next generation of linear accelerators and free-electron lasers. Our program will make a significant advance in a key laser technology needed for these next-generation systems.

Company:

Tech-X Corporation
5621 Arapahoe Avenue
Suite A
Boulder, CO 80303-1379

Title:

Efficient Multiscale Algorithms for Modeling Coherent Synchrotron Radiation

Summary:

A physical process called coherent synchrotron radiation can seriously limit performance of existing and future DOE-operated particle-accelerator-based facilities. This project will develop computational tools that will allow DOE- and DoD-funded scientists to accurately model and more efficiently mitigate the adverse effects of coherent synchrotron radiation.

Company:

Tech-X Corporation
5621 Arapahoe Avenue
Suite A
Boulder, CO 80303-1379

Title:

Virtual Cavity Prototyping with VORPAL

Summary:

Giving the designers of superconducting radio frequency accelerator cavities the ability to test their designs before they build physical prototypes will save both time and money. This project will develop software that will allow the testing of cavity designs in a virtual environment.

Company:

Tech-X Corporation
5621 Arapahoe Avenue
Suite A
Boulder, CO 80303-1379

Title:

High Fidelity Simulation of Low-Energy Ion Beam Chopping for the Spallation Neutron Source

Summary:

Commercial software will be used and further enhanced in order to reduce risk and cost for planned experiments at Oak Ridge National Lab, which are part of the planned upgrade to the Spallation Neutron Source, an important DOE user facility for a wide range of research and development efforts.

Company:

Tech-X Corporation
5621 Arapahoe Avenue
Suite A
Boulder, CO 80303-1379

Title:

Simulation of Short-Range Wakefields in Accelerating Structures for X-Ray Sources

Summary:

Significant scientific discovery is enabled by particle accelerator-based sources of X-rays. Existing software is being enhanced to enable the efficient, accurate design of critical components, leading to improved capabilities and reduced costs.

TOPIC: INSTRUMENTATION FOR ELECTRON MICROSCOPY AND SCANNING PROBE MICROSCOPY

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Company:

Advanced Research Corporation
4459 White Bear Parkway
White Bear Lake, MN 55110

Title:

Scanning Probe Microscopy

Summary:

This project will develop a sensor and technique for measuring high frequency magnetic fields associated with nano-scale structures. This will advance the state of the art ability to quantify and understand electric and magnetic properties on this scale.

Company:

Hummingbird Scientific, LLC
8300 28th Court NE
Unit 200
Lacey, WA 98516

Title:

A High Applied Field Magnetizing Holder for the TEM

Summary:

Scientists can use electron microscopes to see the internal structure of materials, and to probe the inter-relationships between the structure, processing and properties of materials. This project will result in hardware that allows researchers to explore how magnetic materials respond internally to the application of high magnetic fields, and can be expected to lead to new insights and the creation of improved functional magnetic devices.

Company:

Hummingbird Scientific, LLC
8300 28th Court NE
Unit 200
Lacey, WA 98516

Title:

An Integrated Environmental Holder for the TEM

Summary:

Exposure of materials to reactive environments can allow exploration of material synthesis from vapor or an improved understanding of the structure and electronic behavior during catalyzed reactions. This project will yield hardware that will allow scientists to more completely characterize such materials in a transmission electron microscope in the presence of gas or liquid at temperature.

Company:

Micro Magnetics, Inc.
421 Carrant Road
Fall River, MA 02720-4711

Title:

Magnetic Tunnel Junction Nanoprobe Compatible with an Atomic Force Microscope

Summary:

This project will develop a new kind of magnetic sensor which measures tiny magnetic fields, such as those created by the microscopic electrical currents in computers and cell phones. This sensor will allow engineers and scientists to better understand magnetic materials and to visualize the behavior of electrical devices.

Company:

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title:

High Bandwidth Optical Detector for Scanning Probe Microscopy

Summary:

Nanoscience is a rapidly advancing field that holds great promise for many areas of scientific study including renewable energy, cancer detection and environmental cleanup. This project will overcome current technological limitations and result in a unique instrument that can be used to help characterize and manipulate nano-scale materials.

TOPIC: INSTRUMENTATION FOR MATERIALS RESEARCH USING SYNCHROTRON RADIATION

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Company:

Applied Diamond, Inc.
3825 Lancaster Pike
Wilmington, DE 19805

Title:

A New Approach to Diamond-Based High Heat Load Monochromators

Summary:

This project will make monochromators of diamond for use in the new generation of synchrotrons at DOE laboratories. These diamond monochromators will reduce the operating expense and increase the capacity of these high power facilities accelerating advances in the materials and biological sciences.

Company:

Luxel Corporation
515 Tucker Avenue
P.O. Box 1879
Friday Harbor, WA 98250-8040

Title:

Wet Sample Holder for Synchrotron-Based X-ray Microscopy

Summary:

This project will develop a sample holder that will permit the study of wet samples in the dry vacuum environment of a synchrotron beamline. The new sample holder will increase efficiency of synchrotron-based microscopy experiments saving time while enabling more sensitive measurements of materials like: landfill soils, experimental concrete mixtures that lessen environmental impact, and living cells.

Company:

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title:

Fast, Photon Counting Detector Arrays with Internal Gain

Summary:

This project aims to investigate a new detector design that will have far reaching implications in fundamental scientific studies as well as commercial applications. It will be useful in diverse fields such as materials studies, health care and space research.

Company:

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title:

Low Cost, High Speed, High Sensitivity Detector for Material Science Studies

Summary:

This project will develop a detector that will allow full exploitation of the outstanding advanced photon sources in which the nation has already invested billions of dollars. In addition to unveiling basic functions of biological systems, this development will have a direct impact on such important applications as baggage scanning and homeland security.

Company:

Voxtel, Inc.
12725 SW Millikan Way
Suite 230
Beaverton, OR 97005

Title:

High-Dynamic-Range, Rad-Hard, Time-Resolved, Correlated X-ray Photon Detector

Summary:

This project will enable the study and development of new nanoscale materials. The benefits of the innovation are significant; currently, insight into the dynamical phenomena of condensed matter occurring on lengths shorter than can be reached in light scattering is necessary, but currently the potential of the latest generation of synchrotrons is limited by available detector technology.

Company:

XIA, LLC
31057 Genstar Road
Hayward, CA 94544

Title:

Electronics for Large Superconducting Tunnel Junction Detector Arrays for Synchrotron Soft X-ray Research

Summary:

This project will develop low cost digital electronics to support large arrays of cryogenic detectors used to detect and measure the energy of very low energy x-rays. These detectors will be used at the nation's synchrotron x-ray facilities to support research in materials science, biology, geology and environmental research.

TOPIC: ADVANCED COAL RESEARCH

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Company:

Accelergy Corporation
111 N. Market Street
Suite 910
San Jose, CA 95113

Title:

Modeling Studies of CO₂ Utilization Routes in Integrated Coal-to-Liquids Processes

Summary:

Through a combination of high efficiency conversion and efficient CO₂ utilization, this project will provide transportation fuels at lower cost and reduced GHG footprint. Because the US has inexpensive and abundant supplies of coal, commercialization of this technology would stimulate economic growth and increase national security while lowering overall US GHG emission.

STTR Project**Company:**

Boston Applied Technologies, Incorporated
6F Gill Street
Woburn, MA 01801-1721

Title:

Novel Wireless NDE Sensors for Continuous Monitoring of Thermal Power Plant Components

Summary:

A novel wireless NDE technology for continuous monitoring of thermal power plant components will find broad applications in both government and commercial markets. The success of this project will have great impacts not only to many current DOE sponsored R&D and commercial programs, but also to the NDE industry at large.

Company:

Eltron Research & Development Inc.
4600 Nautilus Court South
Boulder, CO 80301-3241

Title:

First Principles Identification of New Cathode Electrocatalysts for Fuel Cells

Summary:

This project will develop new cathode electrocatalysts for solid oxide fuel cells (SOFCs). Since this component generally limits fuel cell performance, development of new materials has the potential to dramatically improve the prospects for SOFCs.

Company:

Intelligent Automation, Inc.
15400 Calhoun Drive
Suite 400
Rockville, MD 20855

Title:

A Secure Wireless AE Sensor Network with Advanced Diagnostic and Prognostic Algorithms for Structural Health Monitoring

Summary:

This project will develop a novel structural health monitoring (SHM) system using state-of-art wireless AE sensor network techniques to prevent the catastrophic failure of critical equipment and components in advanced power plants.

Company:

Southwest Sciences, Inc.

1570 Pacheco Street
Suite E-11
Santa Fe, NM 87505-3993

Title:

NDE of Gas Turbine Thermal Barrier Coatings

Summary:

This project will develop a method for inspecting power plant and aircraft engine turbine parts that are coated with advanced ceramic materials known as thermal barrier coatings. These coating will greatly improve the performance, life and safety the turbines.

Company:

Techno-Sciences, Inc.
11750 Beltsville Drive
Beltsville, MD 20705

Title:

Non-Destructive Condition Monitoring for Power Plants

Summary:

Structural failures in power systems may lead to forced outage and loss of plant availability, which is extremely costly. A non-destructive condition monitoring system will be developed for real-time analysis and monitoring of structural damage that may be observed at several plant locations.

TOPIC: ADVANCED BATTERY ELECTRODE DEVELOPMENT

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Company:

Electrochemical Systems, Inc.
9052 High Bridge Drive
Knoxville, TN 37922

Title:

Development of High Energy, Low Temperature Rechargeable Battery for Load Leveling Application

Summary:

This project will develop high energy battery. This battery will store energy from various sources of energy including renewable sources of energy more economically and reliably than presently available systems.

Company:

Materials Modification, Inc.
2721-D Merrilee Drive
Fairfax, VA 22031

Title:

Nanostructured Cathode for Magnesium Ion Batteries

Summary:

Magnesium batteries show promise as an eco-friendly replacement to lead acid batteries and a cost-efficient alternative to lithium ion batteries. This project will develop a nanostructured cathode material that will have good magnesium ion mobility and electronic conductivity, thereby rendering magnesium ion batteries practical.

Company:

Physical Sciences Inc.
20 New England Business Center
Andover, MA 01810

Title:

Non-Fracturing, High Performance NiMH Negative Electrode

Summary:

The technology from this project will improve nickel metal hydride (NiMH) batteries with higher performance at a lower cost. These advancements make NiMH competitive for energy storage for utility applications.

Company:

Precision Energy and Technology
2000 Composite Drive
Kettering, OH 45420

Title:

Novel Energy Storage in a Hybrid Electrochemical Cell

Summary:

This project explores a novel electrochemical method of storing electrical energy generated during off-peak periods so that it can be used to offset electrical demand during peak-use periods on an electrical grid.

TOPIC: MATERIALS FOR NUCLEAR ENERGY SYSTEMS

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Company:

Innovative Technology, Inc.
P.O. Box 60007
Santa Barbara, CA 93160

Title:

Kinetic Metallization of Corrosion Resistant Coatings for Molten Salt Heat Exchanger Components on NGNP(IV)

Summary:

Next Generation Nuclear Plants using Advanced Gas Cooler Reactors require advanced materials to accommodate high operating temperatures and corrosive molten salt environments. This project will develop protective coatings using the Kinetic Metallization process for application to molten salt heat exchanger components that will extend the life of these structures and reduce the maintenance cost for these power and hydrogen generation plants.

Company:

Lambda Research, Inc.
5521 Fair Lane
Cincinnati, OH 45227

Title:

Stress Corrosion Cracking Mitigation and Fatigue Strength Improvement of Light Water Reactor Components Using Low Plasticity Burnishing (LPB)

Summary:

A novel method of introducing compressive residual stresses into nuclear reactor components using low plasticity burnishing (LPB) is proposed. Material degradation caused by SCC and corrosion fatigue can be dramatically reduced or even eliminated in critical nuclear components through the implementation of LPB.

Company:

REB Research & Consulting
12851 Capital Street
Oak Park, MI

Title:

Ti₂AlNb-Coated Refractory Alloys for Generation IV Nuclear Reactor Construction

Summary:

This project will develop a new, high temperature composite material with properties that are attractive for use in new, Generation IV nuclear reactors.

Company:

Titanova, Inc
12724 Pennridge Drive
Bridgeton, MO 63304

Title:

In Situ Diode Laser Cladding of Erosion Resistant Alloys for Repair of Light Water Reactor Systems and Components

Summary:

This project will develop portable diode laser cladding systems for purpose of repairing nuclear power plant systems and components. This program will create high skill jobs, extending the life of the nations 104 nuclear power plants, which provides over 20 percent of the current U.S. electricity supply without carbon emissions.

Company:

Visual Composites, LLC
5451 Merwin Lane
Erie, PA 16510

Title:

Intermediate Heat Exchanger for Framatome High Temperature Reactor

Summary:

A high temperature silicon carbide heat exchanger will be tested as an option for the very high temperature Framatome-ANP nuclear reactor concept. This novel component is a key element in the success of generating electricity and hydrogen without making harmful green-house gases.

TOPIC: SOLID STATE LIGHTING

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Company:

Cermet, Inc.
1015 Collier Road
Bldg H
Atlanta, GA 30318

Title:

Nonpolar Green LEDs Based on InGaN

Summary:

This project will develop a green light emitting diode that produces the most amount of green light with the least possible input power. This technology can be coupled with other lighting technology to produce light sources that are highly energy efficient.

Company:

MicroContinuum, Inc.
57 Smith Place
Cambridge, MA 02138

Title:

Roll-To-Roll Process for Transparent Metal Electrodes in OLED Manufacturing

Summary:

A new generation of products made possible by light-emitting polymers on thin flexible films will open many new markets, such as roll-up lighting, TVs and displays. The technology being advanced under this SBIR will provide breakthrough manufacturing technology that can reduce costs and improve the performance of these devices.

STTR Project**Company:**

Solaro Incorporated
153 Hollywood Drive
Coppell, TX 75019

Title:

Bright White Tandem OLED with Carbon Nanotube Hole Injecting Interlayer

Summary:

This project will develop innovative nanotechnology for manufacturing of high efficiency and brightness organic light emitting diodes (OLEDs). Furthermore, the proposed technology is cost-effective and resolves limitations in device lifetime. The commercial applications include displays, residential and commercial lighting.

Company:

TDA Research, Inc.
12345 W. 52nd Avenue
Wheat Ridge, CO 80033-1916x

Title:

Self-Assembled Rare Earth Doped Nanostructured Metal Aluminate Phosphors

Summary:

Solid state lighting will reduce electrical consumption and its environmental impact and have a positive economic impact on the U.S. (\$115 billion annual savings). The new phosphors developed in this Phase I project are an enabling technology for white light production from blue- and UV-emitting LEDs.

Company:

Universal Display Corporation
375 Phillips Blvd.
Ewing, NJ 08618

Title:

Novel High Performance Permeation Barrier for Long Lifetime Flexible OLED Lighting

Summary:

This project will establish the feasibility of increasing capacity and efficacy of Grid-Independent Photovoltaic (PV) Solid State Lighting (SSL) systems while at the same time reducing operating costs and risks for larger-scale applications, such as roadway, parking lot and temporary/emergency illumination.

Company:

Universal Display Corporation
375 Phillips Blvd.
Ewing, NJ 08618

Title:

Ultra High Efficiency Phosphorescent OLED Lighting

Summary:

This project will increase the conversion efficiency of electrical energy into light of organic-light emitting devices and thereby enable replacement of inefficient incandescent bulbs, which consume over 8% of the electricity produced in the United States. Our portfolio of technical expertise will enable the development of high-efficiency, environment-friendly, solid-state, white-lighting sources.

TOPIC: ADVANCED MATERIALS AND TECHNOLOGIES FOR COOLING AND WASTE HEAT RECOVERY

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Company:

3TEX, Inc.
109 MacKenan Drive
Cary, NC 27511

Title:

Advanced Heat Exchanger based on 3D Woven Metal Wires

Summary:

Heat exchangers find application in a multitude of consumer products, transportation systems, and industrial processes. Published research on 3-D woven Al wire heat exchangers demonstrated heat transfer rates exceeding the performance of state-of-the-art fin structures. This project will demonstrate the concept's feasibility by the design, fabrication, and testing of a prototype heat exchanger. Data from the testing will provide both characterization of the heat transfer and flow restrictions of the 3-D woven structure and provide a direct comparison to a standard structure.

Company:

Advanced Cooling Technologies, Inc.
1046 New Holland Avenue
Lancaster, PA 17601

Title:

Nanofluids Enhanced Twisted Tape Heat Exchanger

Summary:

Effectively increasing thermal performance of conventional heat exchangers will reduce size, weight, pumping power and cost of the heat exchanger. This project will develop advanced heat exchanger with twisted tape inserts and newly innovated nanofluids as a working fluid to achieve higher efficiency.

STTR Project**Company:**

Advanced Cooling Technologies, Inc.
1046 New Holland Avenue
Lancaster, PA 17601

Title:

Stabilization of Nanofluids Using Self Assembled Monolayers

Summary:

Heat transfer is an important part of many energy intensive processes. More efficient heat transfer leads to more efficient use of fuel. Nanofluids have the capability of increasing heat transfer efficiency in many current heat exchangers by improving the heat transfer properties inherent to current coolants.

STTR Project**Company:**

Aegis Technology Inc.
3300 A Westminster Avenue
Santa Ana, CA 92703

Title:

Nanotube-Enhanced Bulk TE Nanocomposite for High-Efficiency Waste Heat Recovery for Electricity Generation

Summary:

This project will develop low-cost, high-efficiency thermoelectric devices and systems for waste heat recovery which will significantly reduce the consumption of energy, and reduce emission and pollution to the environment. The development of the high-ZT bulk TE nanocomposites provides a commercially viable approach to achieve these objectives.

Company:

Aspen Aerogels, Incorporated
30 Forbes Road, Bldg B
Northborough, MA 01532

Title:

Aerogel Derived Nanostructured Thermoelectric Materials

Summary:

This project will develop the materials required to fabricate refrigerators and air conditioners that do not require a refrigeration gas for operation. They will be more efficient, lighter, quieter, more compact, and more durable while costing less than conventional refrigeration technologies.

Company:

Energent Corporation
2321 S. Pullman Street
Santa Ana, CA 92705

Title:

Research and Development of an Advanced Turbo Vapor Compression System

Summary:

The project will develop a new air conditioning system that can reduce power costs by as much as 10-30%. The new system, the T-VAC system will enable the economic use of new refrigerants that reduce greenhouse gas emissions that cause Global Warming.

Company:

Nanohmics, Inc.
6201 E. Oltorf Street #400
Austin, TX 78741

Title:

Vacuum Microelectronic Thermoelectric Cooler

Summary:

To address the ever expanding need for compact, highly efficient refrigeration, Nanohmics, Inc. is developing a solid state thermoelectric cooler based on cold cathode technology. The vacuum microelectronic cooler promises to be rugged, inexpensive, and suitable for a variety of refrigeration needs.

Company:

R&D Dynamics Corporation
15 Barber Pond Road
Bloomfield, CT 06002

Title:

High Efficiency R744 Centrifugal Chiller

Summary:

A carbon dioxide (R744) centrifugal chiller cycle is proposed which is highly efficient and uses a refrigerant having zero GWP (Global Warming Potential). The new chiller cycle will use 60% less power than current R744 cycles in the case of 150 ton capacity chillers.

Company:

Romny Scientific Incorporated
865 Marina Bay Parkway
Suite #42
Richmond, CA 94804

Title:

Automotive Waste Heat Recovery by High Efficiency Thermoelectric Generators

Summary:

This project will develop technology that converts waste heat into useful electrical energy, allowing the automotive and other industries to become significantly more energy efficient. The successful deployment of this technology will improve reduce the use of fossil fuels and positively impact the environment and economy.

TOPIC: ENERGY EFFICIENT MEMBRANES

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Company:

Compact Membrane Systems, Inc.
335 Water Street
Newport, DE 19804-2410

Title:

Novel Ethanol Dehydration Membranes

Summary:

This project seeks to lower the cost of production by use of membrane water separation systems to produce high quality fuel grade ethanol or other biofuels.

Company:

Compact Membrane Systems, Inc.
335 Water Street
Newport, DE 19804-2410

Title:

Novel Membranes for Enhancing Value of Bio-Oil

Summary:

This project will develop a product to remove water and oxygen from biofuels and other organic end products resulting in increased stability and alleviating storage problems reducing waste and increasing the value of the manufactured product.

Company:

Compact Membrane Systems, Inc.
335 Water Street
Newport, DE 19804-2410

Title:

New Fabrication Technique for Ultrathin Membranes

Summary:

This project will improve productivity and separation capability of gas separation membranes. This will have large impact on capital and energy costs for supplying industrial gases to the chemical process industry.

Company:

Compact Membrane Systems, Inc.
335 Water Street
Newport, DE 19804-2410

Title:

New Membrane Structure for Gas Separations

Summary:

This project will result in the development of a new membrane system specifically focused to increasing the value of poor natural gas reserves by removing unwanted components. This technology may also find use in other carbon dioxide removal processes.

Company:

Giner Electrochemical Systems, LLC
89 Rumford Avenue
Newton, MA 02466-1311

Title:

High Performance Membrane for Chlor-Alkali Electrolysis

Summary:

Currently, chlor-alkali and other electrolytic processes consume >6% of the total US electrical generating capacity. If the concept of employing DSM in membrane electrolyzers is proven successful, energy savings of the order of hundreds of billions of watt-hours per year can be realized without changing existing hardware or operating schemes.

Company:

InnovaTek, Inc.
350 Hills Street, Suite 104
Richland, WA 99354-5511

Title:

Integrated Membrane Water Gas Shift Reactor for Hydrogen Production

Summary:

This project will develop advanced membrane reactor technology for the production of clean hydrogen that can result in economic, energy, and environmental benefits by opening new avenues for energy production, reducing energy consumption, increasing capital productivity, and reducing waste and pollutants.

Company:

Materials and Systems Research, Inc.
5395 West 700 South
Salt Lake City, UT 84104

Title:

Development of a "4-in-1" Device for Cost Effective and Efficient Production of Hydrogen

Summary:

This project will lead to the development of an economical means to intensify hydrogen production processes for various applications such as transportation, petroleum refinery, military and residential use.

Company:

Membrane Technology and Research, Inc.
1360 Willow Road, Suite 103
Menlo Park, CA 94025

Title:

Acetic Acid Recovery Using Membranes

Summary:

Large amounts of acetic acid (in dilute aqueous streams) are lost by U.S. producers and users of this important chemical. This project will develop a process that will allow acetic acid to be more economically recovered for reuse. Compared to conventional distillation alone, the proposed technology will lower the energy costs of acetic acid recovery from acetic acid/water streams by more than 60%.

TOPIC: CATALYSIS

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Company:

Exelus, Inc.
110 Dorsa Avenue
Livingston, NJ 07039

Title:

Catalytic Processing of Biomass to Liquid Fuels

Summary:

This project will develop a new, cost-effective method for converting non-food biomass into gasoline-like motor fuels. It uses original reactor designs and catalysts to produce high quality liquid fuels.

STTR Project**Company:**

InnoSense, LLC
2531 West 237th Street
Suite 127
Torrance, CA 90505

Title:

Direct Conversion of Carbon Dioxide to Methanol

Summary:

A novel fiber optic chemical sensor with anticipated higher sensitivity and lower cost than those of existing ones will be developed. As a process control device, such a probe could significantly increase the energy efficiency of the chemical and petrochemical industries.

Company:

ProteoGenesis, LLC
2109 W. Market Street
Johnson City, TN 37604

Title:

Recombinant Expression and Characterization of Novel Cellulases for Switchgrass Ethanol Production

Summary:

The United States is in need of a renewable and clean energy supply. This project will develop novel enzymes that could make the process of converting switchgrass into ethanol a commercially viable source of renewable energy and create a new energy sector and agricultural job base in America.

Company:

Reactive Innovations, LLC
2 Park Drive, Unit 4
Westford, MA 01886

Title:

Electrocatalytic Conversion of Carbon Dioxide to Commercial Products

Summary:

This project will develop a process to convert carbon dioxide gas into commercial products.

Company:

TDA Research, Inc.
12345 W. 52nd Avenue
Wheat Ridge, CO 80033-1916x

Title:

Novel Catalytic Alkane Oxidation Process

Summary:

Ethanol is a versatile chemical that is used as a chemical solvent, sterilizer, antifreeze, chemical intermediate, and an oxygenate in fuels. TDA's new catalytic process produces ethanol more cheaply than current synthetic processes and can be used in existing petrochemical plants.

TOPIC: NANOTECHNOLOGY

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Company:

ADA Technologies, Inc.
8100 Shaffer Parkway, Suite 130
Littleton, CO 80127-4107

Title:

Nanostructured High Voltage Cathode Materials for Advanced Lithium-ion Batteries

Summary:

High performance and long lifetime energy storage devices are critical for zero-emission advanced transportation technologies. This project proposes to develop high performance electrode materials and combine them with environmentally benign electrolytes to develop advanced lithium-ion batteries to fulfill this requirement.

Company:

Aegis Technology Inc.
3300 A Westminster Avenue
Santa Ana, CA 92703

Title:

Nanoparticle-Sized, High-voltage Cathode Materials for Use in Advanced Lithium-Ion Cells

Summary:

The successful development and application of high-power, reliable Li-ion batteries for future PHEV will significantly improve energy efficiency, reduce the emission and dependence on petroleum, and improve the competitiveness of U.S. manufacturing in global market of HEVs. The development of advanced nanomaterials for positive electrodes is an essential step to achieve these benefits.

Company:

Applied Nanotech, Inc.
3006 Longhorn Blvd., #107
Austin, TX 78758-7518

Title:

CNT-Based Electrostatic Atomizing Fuel Injector Promoting Fuel Combustion Efficiency

Summary:

This project will develop an electronic CNT atomizing fuel injector, a novel fuel efficient device needed for the next generation of internal combustion engines, leading to a remarkable improvement in automotive performance and fuel economy.

Company:

MesoCoat, Inc.
24112 Rockwell Drive
Euclid, OH 44117-1252

Title:

Fused Nanocomposite Claddings for Oil and Energy Applications

Summary:

This project will demonstrate low cost, large area application technology and nanoengineered coatings to protect metal structures against wear and corrosion.

Company:

NEI Corporation
400 Apgar Drive
Suite E
Somerset, NJ 08873

Title:

Nanocomposite High Voltage Cathode Materials for Li-Ion Cells

Summary:

This project will develop and implement a new class of 5V high voltage Li-ion battery cathode material for next generation plug in hybrid electric vehicles (PHEVs).

Company:

TIAX, LLC
15 Acorn Park
Cambridge, MA 02140-2301

Title:

Enabled VOC Sensor for Energy-Efficient Building Ventilation

Summary:

This project will develop a sensor technology that allows for efficient management of building ventilation, while maintaining a healthy environment for occupants. With widespread adoption, it has the potential to save billions in energy costs with a relatively short payback period.

TOPIC: TECHNOLOGIES RELATED TO ENERGY STORAGE FOR HYBRID AND PLUG-IN HYBRID ELECTRIC VEHICLES

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Company:

EIC Laboratories, Inc.
111 Downey Street
Norwood, MA 02062

Title:

Flameproof Additives for Automotive Li Ion Batteries

Summary:

This project will develop liquid additives to large lithium-ion batteries to be used in electric vehicles. The additives will suppress flammability that may be brought about by an accident or electrical failures.

Company:

Farasis Energy, Inc.
23575 Cabot Blvd.
Suite 206
Hayward, CA 94545

Title:

Novel, High Performance Li-Ion Cell

Summary:

This project will develop a novel approach to increasing the performance and capacity of Li-ion cells. Use of the technology could accelerate the adoption of efficient distributed power systems and EVs by greatly increasing the life of the battery systems.

STTR Project**Company:**

Ionova Technologies, Inc.
182 Thomas Johnson Drive
Suite 204L
Frederick, MD 21702

Title:

3-D Nanofilm Asymmetric Ultracapacitor

Summary:

This project will apply advances in nanotechnology to create a new type of ultracapacitor energy storage device. Resulting ultracapacitors will be capable of storing significantly greater amounts of energy than commercially available devices while providing dramatic improvements in safety, cost, safety, environmental impact and in other important metrics.

Company:

Luna Innovations Incorporated
1 Riverside Circle
Suite 400
Roanoke, VA 24016

Title:

Asymmetric Electrochemical Capacitors for Hybrid Vehicle Technology

Summary:

This project will develop high energy and high power capacitors suitable for use in hybrid electric vehicles. Novel carbon nanomaterials will be used to advance capacitor technology in order to implement these energy storage devices in commercial vehicles.

Company:

Metamateria Partners, LLC
1275 Kinnear Road
Columbus, OH 43212

Title:

Nanocomposite Positive Electrode for Asymmetric Electrochemical Capacitors

Summary:

Nanostructured positive electrode will be developed for energy storage devices materials for HEV and PHEV. These will improve energy and power density of supercapacitors and may lead to commercialization of electric vehicles.

Company:

TIAX, LLC
15 Acorn Park
Cambridge, MA 02140-2301

Title:

Implantation, Activation, Characterization and Prevention/Mitigation of Internal Short Circuits in Lithium-Ion Cells

Summary:

This project will develop technology to improve safety of batteries for PHEVs and HEVs, making these vehicle technologies more commercially viable, and thus increasing likelihood that they will yield their potential environmental, economic and political benefits.

Company:

Yardney Technical Products, Inc.
82 Mechanic Street
Pawcatuck, CT 06379

Title:

Reciprocal Lithium-ion Cell with Novel Lithium-Free Cathode and Pre-Lithiated Carbonaceous Anode

Summary:

This project will develop an inexpensive and environmentally benign lithium-ion cell with novel cathode and pre-lithiated carbon anode. The essential feature of the developing cell is that it is in charged state being just assembled while the traditional lithium-ion cell must pass a so-called "formation step" (few charge-discharge cycles lasting about a week) after assembling.

TOPIC: ENERGY SAVINGS TECHNOLOGIES FOR COMMODITY MANUFACTURING INDUSTRIES

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Company:

CyboSoft, General Cybernation Group, Inc.
2868 Prospect Park Drive, Suite 300
Rancho Cordova, CA 95670

Title:

Intelligent Industrial Furnace Control Using Model-Free Adaptive Control Technology

Summary:

This project will result in an intelligent control solution for controlling industrial furnaces that can significantly improve energy efficiency and cost-effectively reduce carbon emissions in the near term. This solution can help the U.S. strengthen its energy security, economic health, and movement towards a cleaner environment.

Company:

Los Gatos Research
67 East Evelyn Avenue
Suite 3
Mountain View, CA 94041

Title:

Novel Sensor for Industrial Process Monitoring

Summary:

This project will support the development and demonstration of a novel instrument with unprecedented speed, specificity and reliability for monitoring and control of combustion emissions and of power plants and industrial processes; and for measurements of atmospheric pollutants, trace gases and greenhouse gases.

Company:

Resodyn Corporation
130 North Main

Suite 600
Butte, MT 59701

Title:

Low Cost Optrodes for Chemical Sensor Development of Tethered PET-Fluorophores

Summary:

This project will produce a novel sensor technology that enables the production of a low-cost optical sensor to determine the level of acidity or alkalinity (pH) over a broad range for industrial, military, and environmental applications. Expected benefits include improved performance, energy savings, enhanced efficiency, and security.

Company:

Spectral Sciences, Inc.
4 Fourth Avenue
Burlington, MA 01803-3304

Title:

Structured Emission Thermometry Sensor for Burner Control

Summary:

This project will produce an optical sensor that will enable glass furnace and other industrial natural gas burners to automatically adjust and optimize their flames. The smart burner technology promises to make gas-fired industrial furnaces cleaner and more fuel efficient.

Company:

TIPD, LLC
9030 S. Rita Road
Suite 120
Tucson, AZ 85747-9102

Title:

Energy Saving Manufacturing Process for Fuel Nozzles

Summary:

This project will develop a new low-cost fabrication technology for fuel nozzles results in improved materials and fuel economy and lower environmental pollution.

TOPIC: INCREASING EFFICIENCY IN TRADITIONAL LIGHTING TECHNOLOGIES

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STTR Project:

Company:

Boston Applied Technologies, Inc.
6F Gill Street
Woburn, MA 01801-1721

Title:

High Efficiency Multiple Wavelength Upconverting Nanophosphors

Summary:

Since lighting accounted for approximately 9% of household electricity usage in the United States, developmental of this technology would significantly reduce energy consumption, reduce the usage of environmentally unfriendly mercury. The energy saving and commercial potential of this proposed technology is tremendous. This project will develop technology that would affect almost everyone's life and the country's economy.

Company:

Energy Focus, Inc.
32000 Aurora Road
Solon, OH 44139

Title:

Increasing Efficiency in Traditional Lighting Technologies High Intensity Discharge Lamps - Arc Tube Coating System for Metal Halide Color Consistency

Summary:

Tremendous energy savings could be achieved by replacing inefficient incandescent lighting with efficient alternatives. The special needs of the accent lighting and commercial spot lighting markets for consistent color and high quality light are not met by today's alternative lighting technologies. This project will enable a low-cost efficient and color-consistent alternative light source to be manufactured in the US for these crucial lighting markets.

STTR Project

Company:

NEMOmetrics Corporation
28 Constitution Road
Boston, MA 02129

Title:

Lighting with No Watt Left Behind

Summary:

This project will create a new technology to simplify and reduce the cost of monitoring unnecessary lighting and to ensure that unoccupied and under occupied areas do not have excessive, unnecessary lighting.

Company:

Redwood Systems
46665 Fremont Blvd.
Fremont, CA 94538-6410

Title:

Auto-Commissioning and Auto-Discovery Control System for Solid State Lighting

Summary:

This project will develop a new, energy efficient LED lighting system that revolutionizes how lighting is powered and controlled. It will also create a lighting network that is intelligent, automated, scalable, and can potentially save 50% to 75% of the energy used to light a commercial office space.

TOPIC: PRODUCTION OF BIOFUELS FROM BIOMASS

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Company:

Lynntech, Inc.
7610 Eastmark Drive
College Station, TX 77840

Title:

Novel Electrochemical Process for Microalgae Harvesting

Summary:

This project will develop a new method for harvesting algae containing bio-oils for biofuel production. This process will enable cost-effective production of advanced biofuels such as biodiesel, green diesel, green gasoline, and green jet fuel reducing our nation's dependence on foreign oil.

Company:

Lynntech, Inc.
7610 Eastmark Drive
College Station, TX 77840

Title:

Magnetic Harvesting of Algae

Summary:

Magnet harvesting of algae offers the prospect of a significant reduction in the cost of harvesting high oil content algae for biofuel use. Combined with algae's high fuel per acre yield, this can increase the availability of cost effective biofuels.

Company:

Renewable Oil International, LLC
3115 Northington Court
Florence, AL 35630

Title:

Development of Cost Effective, Small Scale Transportable Fast Pyrolysis Plants

Summary:

Declining petroleum resources, combined with increased demand for petroleum by emerging economies, as well as political and environmental concerns about fossil fuels, are causing our society to search for new sources of liquid fuels. This project will develop a method for conversion of biomass into liquid fuels at a small scale called fast pyrolysis - a process whereby biomass is rapidly converted into a liquid biocrude which can be used for fuel oil or upgraded into gasoline and diesel fuels.

Company:

TDA Research, Inc.
12345 W. 52nd Avenue
Wheat Ridge, CO 80033-1916

Title:

Low-Cost Polymer Flocculant for Algae Production

Summary:

This project will develop a new low-cost polymer flocculant that will make it less expensive to harvest algae cells from large-scale farms. Algae is the only renewable feedstock that can offset more than 50% of the domestic petroleum diesel market, but the cost of growing algae must be reduced.

TOPIC: ADVANCED WATER POWER TECHNOLOGY DEVELOPMENT

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Company:

Advanced Energy Conversion, LLC
Suite 500, 10 Hermes Road
Malta, NY 12020

Title:

Hydroelectric Energy from Wastewater

Summary:

The effluent stream of a wastewater treatment facility contains substantial energy that can be harnessed to offset its power demand. This project will develop and demonstrate a full-scale system that can be replicated at municipal wastewater facilities around the country, and the world.

Company:

Composite Technology Development, Inc.
2600 Campus Drive, Suite D
Lafayette, CO 8002-3359

Title:

Advanced Composite Materials for Tidal Turbine Blades

Summary:

Marine current energy is a form of renewable energy that holds substantial promise in meeting the future energy needs of the United States. Reliability of these systems including the tidal turbine blades is of paramount importance to enabling their economic and performance feasibility.

Company:

Concepts NREC
217 Billings Farm Road
White River Junction, VT 05001

Title:

Development of a Self-Adaptive Air Turbine for Wave Energy Conversion using an Oscillating Water Column (OWC) Air System

Summary:

The utilization of the world's ocean as a renewable energy resource can be made more economically viable if a re-design of the turbine-generator sub-systems is performed to enable the energy recovery of more wave energies. An improvement as high as 40% has been projected using theoretical performance models of the energy recovery systems if proposed redesigns are implemented.

Company:

Princeton Power Systems, Inc.
501 Forrestal Road
Suite 211
Princeton, NJ 08540

Title:

High-Voltage, Highly-Efficient, Power-Dense Electronic Converter Using Silicon Carbide and AC-link

Summary:

This project will develop a hydro and ocean power conversion systems that will significantly reduce the cost of these generation sources and make them more efficient and more compatible with the existing electric grid. This will displace polluting, fossil fuel-burning power generators with a clean, renewable energy source.

Company:

Resolute Marine Energy, Inc.
126 Summer Street
Watertown, MA 02472

Title:

Advanced Water Power Technology Development Wave and Current Energy Technologies

Summary:

This project will investigate innovations related to the improved performance of ocean wave energy converters. Ocean waves are a clean and abundant source of renewable energy that can make a significant contribution to U.S. electric power requirements.

TOPIC: WIND ENERGY TECHNOLOGY DEVELOPMENT

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Company:

Intelligent Optical Systems, Inc.
2520 W. 237th Street
Torrance, CA 90505-5217

Title:

In-line Inspection of Welds used for Wind Turbine Tower Assembly

Summary:

This project will determine the feasibility of applying non-contact laser-based techniques for inspecting the welds used in wind turbine tower assembly. In-line inspection will speed the weld process and reduce costs and energy consumption.

STTR Project**Company:**

Intelligent Fiber Optic Systems Corporation
2363 Calle Del Mundo
Santa Clara, CA 95054-1008

Title:

Fiber-Optic Defect and Damage Locator System for Wind Turbine

Summary:

Increased harnessing of wind power benefits the planet by providing a renewable energy source reducing our reliance on

fossil fuels. This novel sensing system will detect defects in wind turbine blades optimizing their performance and preventing costly turbine shut downs due to predictable blade failures.

Company:

Resodyn Corporation
130 North Main
Suite 600
Butte, MT 59701

Title:

An Advanced Vibrothermography Approach for Wind Turbine Applications

Summary:

A reliable, portable, instrumentation deployment system that can be utilized during wind turbine composite members manufacturing, during installation, and throughout the lifetime of wind turbine systems will be developed. This project will develop technology that has the potential to dramatically reduce the yearly wind turbine maintenance costs, resulting in reduced consumer power costs.

TOPIC: GEOTHERMAL TECHNOLOGIES

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Company:

Physical Optics Corporation
20600 Gramercy Place, Bldg. 100
Torrance, CA 90501-1821

Title:

Fiber Optic High Temperature Seismic Sensor

Summary:

This project will develop an innovative seismic sensor based on fiber optics to monitor geothermal wells. This sensor not only endures high temperature (300oC for over 5000 hrs) but also outperforms all conventional devices in terms of temperature endurance and fast response.

TOPIC: HYDROGEN, FUEL CELLS AND INFRASTRUCTURE TECHNOLOGIES

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Company:

ElectroChem, Inc.
400 West Cummings Park
Woburn, MA 01801

Title:

Advanced PEM Based Hydrogen Home Refueling Appliance

Summary:

This project will develop a small appliance for refueling hydrogen vehicles by the homeowner that is low cost and uses inexpensive off-peak electricity to produce hydrogen from water. This appliance will reduce the infrastructure cost for development of the hydrogen vehicle market in both the near and long term.

Company:

Giner Electrochemical Systems, LLC
89 Rumford Avenue
Newton, MA 02466-1311

Title:

Unitized Design for Home Refueling Appliance for Hydrogen Generation to5000 psi

Summary:

To enable the transition to a hydrogen economy, the successful implementation of a "unitized" electrolyzer design that can be used as a home refueling appliance will result in a safe, high-efficiency, low capital cost system that will provide competitively-priced hydrogen for fuel-cell vehicles.

Company:

Lynntech, Inc.
7610 Eastmark Drive
College Station, TX 77840

Title:

Design, Optimization and Fabrication of a Home Hydrogen Fueling System

Summary:

This project will identify infrastructure problems and system requirements to design and fabricate an affordable, safe and energy efficient home hydrogen fueling appliance. It is targeted to meet hydrogen refueling needs of the average US traveler on a daily basis and has potential application as backup power source in emergencies.

STTR Project

Company:

Materials and Systems Research, Inc.
5395 West 700 South
Salt Lake City, UT 84104

Title:

Development of a Hydrogen Home Fueling System

Summary:

This project provides a technical and economic means for development of hydrogen home fueling systems featuring hydrogen, power and heat tri-generation.

Company:

Proton Energy Systems
10 Technology Drive
Wallingford, CT 06492

Title:

Hydrogen by Wire- Home Fueling System

Summary:

One of the most attractive ways to implement a home hydrogen fueling station is the proton exchange membrane (PEM) water electrolysis hydrogen generator. PEM technology can generate the hydrogen fuel from renewable electricity and directly fill a vehicle at home in the user's garage.

Company:

Reactive Innovations, LLC
2 Park Drive, Unit 4
Westford, MA 01886

Title:

On-Line Measurement of PEM Electrolyzer Stacks

Summary:

This project will develop a sensor to assess the quality of membrane and electrode assemblies before they are incorporated into higher-value electrolyzers. The success of this product innovation will help lower the manufacturing cost for water electrolyzers targeted by the Department of Energy to generate hydrogen for transportation and stationary applications.

Company:

TIAX, LLC
15 Acorn Park
Cambridge, MA 02140-2301

Title:

Modeling of Hydrogen Dispensing Options for Advanced Storage

Summary:

On-board vehicle hydrogen storage volumetric and gravimetric targets have not been achieved with 35 MPa compressed hydrogen storage. Five promising advanced storage categories have been identified by the DOE; and this project will develop hydrogen dispensing configurations and cost estimates for each storage option.

TOPIC: SOLAR ENERGY

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Company:

Aspen Aerogels, Incorporated
30 Forbes Road, Bldg B
Northborough, MA 01532

Title:

Transparent Aerogel Insulation for Solar Heat Concentration Elements

Summary:

This project will develop a new insulation technology to improve the cost efficiency of generating electricity with solar power. The insulation will be applied to the pipe lines that are heated by concentrating sunlight on the pipes using arrays of parabolic mirror troughs.

Company:

Luna Innovations Incorporated
1 Riverside Circle
Suite 400
Roanoke, VA 24016

Title:

Highly Efficient Organic Solar Cells Using Low Band Gap Polymers and Novel Acceptor Materials

Summary:

This project will combine low band gap polymers and novel acceptor materials to improve the efficiency of flexible organic solar cells. Using nanotechnology, these newly developed materials give improved efficiency compared to current technology.

Company:

MicroLink Devices
6457 West Howard St
Niles, IL 60714

Title:

Backside Contact Multijunction Solar Cells for Concentrator Applications

Summary:

This project will develop new solar cell device technologies that enable solar power generation with lower cost and higher

efficiency. Multijunction solar cells with backside contacts are being developed that will enable significant improvements in the performance of concentrating solar power systems.

Company:

NanoSonic, Inc.
1485 South Main Street
Blacksburg, VA 24073

Title:

Low-Cost Solar Coatings for Improved Thermal Performance of Components in Concentrating Solar Power Systems

Summary:

This project would design, develop and construct prototypes of new, low-cost and energy efficient coatings for the surfaces of receiver piping used in solar power generation systems. This project will develop technology that can be transitioned to solar thermal field installation and long-term, "green energy" production through our partnership with the Solar Power Technology group within Lockheed Martin Corporation, partnered with Starwood energy Group.

Company:

SVV Technology Innovations, Inc.
5022 Bailey Loop, Suite 120
McClellan, CA 95652

Title:

Concentrator PV Receiver Based on Crystalline Si Cells

Summary:

This project will develop and demonstrate a new approach for making inexpensive modular systems for generating electricity from sunlight. It will make viable the large-scale, distributed energy production from renewables and help meet the national goals of energy independence, reduction of carbon emissions and fostering the job growth and economic progress.

Company:

TDA Research, Inc.
12345 W. 52nd Avenue Wheat Ridge, CO 80033-1916

Title:

A New Three-Part Architecture for Efficient and Stable Bulk Heterojunction OPV Devices

Summary:

Solar cells from organic materials can potentially be made at very low cost relative to cells made from silicon. This project will use a new combination of materials that will simultaneously increase the efficiency and stability of solar cells so that they become suitable for commercialization.

**TOPIC: IMPROVED MOTOR DESIGNS AND POWER ELECTRONICS
ADVANCEMENTS FOR HYBRID AND PLUG-IN ELECTRIC VEHICLES**

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Company:

Applied Nanotech, Inc.
3006 Longhorn Blvd., #107
Austin, TX 78758-7518

Title:

Sintered Copper Ink as a Low Cost Replacement for High Temperature Solders

Summary:

This project will develop copper nanoparticle ink that can be used as a bonding material in electronics. This is a direct replacement of traditional and lead-free solders that fatigue in demanding applications, e.g., hybrid electric vehicles power electronics.

Company:

Creative Electron, Inc.
310 Via Vera Cruz, Suite 107
San Marcos, CA 92078

Title:

Sintered Conductive Adhesives for High Temperature Packaging

Summary:

In order to reduce the cost of Hybrid electric vehicles (HEVs) and future Plug-In Hybrid Electric Vehicles (PHEVs) this project will develop a lead-free and RoHS compliant transient liquid phase sintered adhesive suitable for automotive thermal management. This will improve the design of motor and power electronics for hybrid and plug-in electric vehicles.

Company:

GeneSiC Semiconductor Inc.
43670 Trade Center Place
Suite 155
Dulles, VA 20166

Title:

Development of an Accelerated Life Test for Wide-Bandgap (SiC) HEV/PHEV Power Conversion Modules

Summary:

A strong interest is expressed by major automobile manufacturers to develop high frequency power circuits for use in emerging Plug-in hybrid electric vehicle applications. This project will develop a Silicon Carbide JFET and rectifier technology, the performance and life-testing of these power modules is critical towards transferring of power from batteries to drive motors, and vice-versa.

Company:

SatCon Technology Corporation
27 Drydock Avenue
Boston, MA 02210-2377

Title:

High-Power-Density, Non-Permanent-Magnet, Electric motor Development for Hybrid, Plug-in Hybrid, and Fuel Cell Vehicles

Summary:

This project will develop improved induction machines using cast copper rotors suitable for vehicle and industrial applications including hybrid, plug-in, and fuel cell vehicles as well as mobile power systems for both military and civilian use.

Company:

SatCon Technology Corporation
27 Drydock Avenue
Boston, MA 02210-2377

Title:

Improvement of Eddy Current Rotor Loss Prediction Techniques

Summary:

This project will develop improved efficiency Permanent Magnet (PM) motor analysis and prediction techniques suitable for vehicle and industrial applications including hybrid, plug-in, and fuel cell vehicles as well as mobile power systems for both military and civilian use.

TOPIC: CLIMATE CONTROL TECHNOLOGY FOR FOSSIL ENERGY APPLICATION

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Company:

Multi-Phase Technologies, LLC
310 Rebecca Drive
Sparks, NV 89441
3 Scott Lane
Manorville, NY 11949

Title:

Wireless Electrical Resistivity Tomography System for CO2 Sequestration Monitoring

Summary:

This project will develop a cost-effective method of monitoring CO2 sequestration reservoirs for potential leakage pathways and for reservoir integrity using a geophysical method, Electrical Resistance Tomography (ERT).

Company:

New England Research, Inc.
331 Olcott Drive, Suite L1
White River Junction, VT 05001

Title:

Geophysical Monitoring of Multiple Phase Saturation of Rocks: Applications to CO2 Sequestration

Summary:

The world is increasingly concerned about global warming from the greenhouse effect; and the voluminous CO2 emissions from human activities are a significant contribution to this problem. This project will develop quantitative monitoring and verification methods essential for successful sequestration of CO2 in underground storage reservoirs.

Company:

Novawave Technologies, Inc.
900 Island Drive
Suite 101
Redwood City, CA 94065

Title:

Isotope Sensor for Carbon Sequestration Monitoring

Summary:

Carbon isotope measurements provide a direct method to discriminate between man-made and natural sources of carbon dioxide, which will be used to detect leaks at carbon sequestration sites. The proposed instrument offers a real-time, autonomous approach to long term monitoring of carbon storage sites.

STTR Project**Company:**

Physical Sciences Inc.

20 New England Business Center
Andover, MA 01810

Title:

Networked Sensors for Sequestration MVA

Summary:

This project will develop, test, and evaluate laser-based sensors for use as tools to monitor the integrity of carbon dioxide sequestration sites and pipelines. These tools will reduce the cost of site operation and verify that sequestration performs the intended function of reducing greenhouse gas emissions.

TOPIC: OIL AND GAS TECHNOLOGIES

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Company:

Eltron Research & Development Inc.
4600 Nautilus Court South
Boulder, CO 80301-3241

Title:

Unconventional High Temperature Nanofiltration for Produced Water Treatment

Summary:

This project will develop unconventional high temperature nanofiltration technology that will enable more economic treatment of produced water originating from domestic oil and gas production resulting in greater utilization of domestic fuel reserves.

Company:

Faraday Technology, Inc.
315 Huls Drive
Clayton, OH 45315

Title:

Faradayic Desalination for Produced Water Treatment

Summary:

This project will address the Department of Energy's need for development treatment technology for the cost effective removal of salinity from produced water. The proposed technology will enable reuse of the proposed water through enhanced ionic removal and reductions in power requirements and membrane fouling tendencies.

Company:

Giner Electrochemical Systems, LLC
89 Rumford Aveue
Newton, MA 02466-1311

Title:

Anti-Fouling Reverse Osmosis Desalination System

Summary:

It is estimated that 14 billion barrels of produced water were generated by onshore exploration and production (E&P) in 2002 alone. This project converts produced water to clean water for drinking and irrigation that will minimize the environmental impact of oil and natural gas production.

TOPIC: COAL GASIFICATION TECHNOLOGIES

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Company:

ACENT Laboratories LLC
3 Scott Lane
Manorville, NY 11949

Title:

A High Efficiency Integrated Syngas Purification and Hydrogen Separation and Storage System

Summary:

A high-efficiency approach to separating hydrogen from the products of coal gasification will be developed based on aerospace-derived technologies. Aerodynamic gas separation is combined with process that results in hydrogen stored in a safe liquid substance, ready for transportation, distribution and hydrogen release on-demand.

Company:

Aspen Products Group, Inc.
186 Cedar Hill Street.
Marlborough, MA 01752

Title:

Novel Materials for Energy Efficient Production of High Purity Oxygen from Air

Summary:

A technology that is able to generate high purity oxygen from air with reduced electrical power consumption relative to current technologies will be developed. The technology will be used to reduce the cost of coal-based electricity generation, reduce emissions from coal power plants, and reduce the cost of producing oxygen for industrial and medical purposes.

Company:

Eltron Research & Development Inc.

4600 Nautilus Court South
Boulder, CO 80301-3241

Title:

An Approach for Enhancement of In-Gasifier Production of Methane

Summary:

Integrated gasification combined cycle technology utilizing solid oxide fuel cells (SOFC's) are very promising, but require methane to ensure fuel cell stability and energy content of the fuel. This project will develop technology that will increase the methane content of gasifier effluent.

Company:

Eltron Research & Development Inc.
4600 Nautilus Court South
Boulder, CO 80301-3241

Title:

Polymer-Zeolite Membrane for Air Separation

Summary:

This project will design novel hybrid membranes enabling commercially viable, large-scale air separation providing >95% pure oxygen for coal gasification; this will make synthesis gas economically more feasible as feedstock for power generation, transportation fuels, hydrogen and chemicals production. Membrane separation technologies offer great potential in many other industrial applications.

Company:

Eltron Research & Development Inc.
4600 Nautilus Court South
Boulder, CO 80301-3241

Title:

Molecular Separations Using Micro-Defect Free Ultra Thin Films

Summary:

Successful development of thin film molecular sieve technology will make the separation of different kinds of molecules much cheaper. This will be of great use to pharmaceutical and chemical industries in addition to energy industries.

Company:

Powdermet, Inc.
24112 Rockwell Drive
Euclid, OH 44117

Title:

Multilayer Tape Casting of Water-Gas-Shift Membranes for H₂ Separation

Summary:

Evaluation of a low cost hydrogen purification membrane for improved cost effectiveness of converting coal to hydrogen for the new hydrogen economy will be investigated. By lowering material cost and using robust proven manufacturing technology this new membrane can cost effectively improve hydrogen production.

Company:

Touchstone Research Laboratory, Ltd.
The Millennium Centre
1142 Middle Creek Road
Triadelphia, WV 26059-9707

Title:

Hybrid Atmospheric Fluidized Bed Gasifier for High Methane Content Syngas

Summary:

This project furthers the development of a hybrid gasification technology that can produce a high methane content syngas from coal or coal/biomass mixtures. A proof-of-concept scale unit will be built and tested using coal to demonstrate feasibility.

Company:

TreadStone Technologies, Inc.
201 Washington Road
Princeton, NJ 08540

Title:

High Temperature Dense Membrane for Hydrogen Separation

Summary:

This project will demonstrate a novel high temperature, durable, and contaminant tolerant membrane reactor that can be consolidate the WGS reaction and hydrogen separation process to produce hydrogen through coal gasification process at low cost.

TOPIC: USE OF ALGAE FOR FUELS PRODUCTION

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Company:

Dynaflow, Inc.

10621-J Iron Bridge Rd
Jessup, MD 20794

Title:

Combined Harvesting of Algae and Extraction of Oil using DynaJets Cavitating Jets

Summary:

Specially designed cavitating jets will be used to release the oil from algae that have been grown as biodiesel feedstock. This technology will reduce production costs and make algae biodiesel more competitive with petroleum diesel.

Company:

Exelus, Inc.
110 Dorsa Avenue
Livingston, NJ 07039

Title:

Jet Fuel from Bio-Diesel

Summary:

This project will develop a new, cost-effective method for converting algal oil into aviation fuel. It uses new chemistry and catalysts to produce clean, renewable jet fuel of identical quality to conventional fuels.

Company:

Lynntech, Inc.
7610 Eastmark Drive
College Station, TX 77840

Title:

Non-Thermal Plasma Cracking of Algae-Derived Biodiesel into Jet Fuel

Summary:

This project will develop technology that will produce aviation fuels from algae-derived biodiesel, which has significant energy density to be used as an alternative transportation fuel source.

Company:

Materials Modification, Inc.
2721-D Merrilee Drive
Fairfax, VA 22031

Title:

Novel Technique for Extraction of Algal Oil for Biodiesel

Summary:

Certain forms of algae have recently been found to be a promising source of biodiesel as they require less area to cultivate than most crops that are used to produce biodiesel and can generate more oil than conventional sources. While there have been many studies to standardize biodiesel production from crop sources, there are no optimized processes for their synthesis from algal extracts. This project will develop an efficient process for the extraction of oil from algae that will bring algal biofuel closer to reality.

Company:

TDA Research, Inc.
12345 W. 52nd Avenue
Wheat Ridge, CO 80033-1916

Title:

Low-cost Hydrodeoxygenation Process for Converting Algae-derived Oil into Aviation Fuels

Summary:

Algae can convert water, carbon dioxide (a greenhouse gas) and sunlight into a vegetable oil that can be used to make fuels for cars, trucks or airplanes. This project will develop a process to produce aviation fuel from the oil extracted from algae that is grown using the CO2 emitted from coal fired power plants.

Company:

TIAX, LLC
15 Acorn Park
Cambridge, MA 02140-2301

Title:

Use of Algae for Fuels Production Concepts for Extracting Oil from Algae

Summary:

Microalgae are a renewable energy source to help reduce U.S. foreign oil dependency. This project will investigate a novel continuous, scalable extractor to release oil from wet algae for biofuel use, offering efficient, sustainable and secure routes to transportation fuels vital to the U.S. economy.

TOPIC: SOLID OXIDE FUEL CELL TECHNOLOGY FOR COAL-BASED POWER PLANTS

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Company:

Eltron Research & Development Inc.
4600 Nautilus Court South
Boulder, CO 80301-3241

Title:

Perovskite Adsorbents for Warm-Gas Arsenic and Phosphorus Removal

Summary:

This project will develop means for removing arsenic and other poisons emitted from gasified coal to acceptable levels. Impurity control will enable use of coal in the next generation of non-polluting and more efficient electric power plants, enable sequestration of carbon dioxide and aid production of synthetic fuels.

STTR Project**Company:**

Faraday Technology, Inc.
315 Huls Drive
Clayton, OH 45315

Title:

Electrodeposited Mn-Co Alloy Coatings for Solid Oxide Fuel Cell Interconnects

Summary:

The realization of solid oxide fuel cells as an alternative energy source could decrease the United States dependence on foreign oil and reduce emissions such as SO_x, NO_x and CO₂, that negatively impact the environment. This project will develop an inexpensive manufacturing process for conductive interconnect coatings that would contribute toward lowering manufacturing costs of solid oxide fuel cells, bringing them one step closer to being a commercially viable alternative energy source.

Company:

Materials and Systems Research, Inc.
5395 West 700 South
Salt Lake City, UT 84104

Title:

Novel SOFC anodes with enhanced tolerance to coal contaminants

Summary:

This project will contribute to the development of a coal-based fuel cell combined power generation system.

Company:

TDA Research, Inc.
12345 W. 52nd Avenue
Wheat Ridge, CO 80033-1916

Title:

Sorbents for Warm Temperature Removal of Arsenic and Phosphorous from Coal-Derived Synthesis Gas

Summary:

The use of advanced, highly efficient and environmentally responsible coal-based power generation processes is hindered by the presence of a wide spectrum trace contaminants. This project will develop sorbents to remove these contaminants in a cost-effective way to support the widespread utilization of coal.

TOPIC: ADVANCED TURBINE TECHNOLOGY FOR IGCC POWER PLANTS

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Company:

Directed Vapor Technologies International, Inc.
2 Boars Head Lane
Charlottesville, VA 22903

Title:

Novel Coating Methods for Unique TBC/Bond Coat Architectures for Elevated Temperature Operation

Summary:

Higher operating temperatures are required to improve the efficiency of clean, coal derived power generation turbine engines. This project will develop high temperature capable thermal barrier coatings to protect metallic turbine engine components during increased temperature operation.

Company:

Florida Turbine Technologies, Inc.
1701 Military Trail
Suite 110
Jupiter, FL 33458-7887

Title:

Development of Innovative Cooling Approaches for Robust Design

Summary:

This project will develop innovative new cooling approaches for robust turbine design to facilitate revolutionary advances of power plant durability, performance, efficiency and clean operation. Such technology could be readily retrofit into existing gas turbine power plants, which make up approximately 14% of our nation's electric power.

Company:

Florida Turbine Technologies, Inc.
1701 Military Trail

Suite 110
Jupiter, FL 33458-7887

Title:

Application of Advanced Refractory Metals in Revolutionary Turbine Airfoils

Summary:

This project will develop an innovative concept for turbine airfoil designs, which enables the use of high-temperature refractory metal alloys and coating systems. Such designs facilitate revolutionary advances in power plant durability, performance, efficiency and clean operation. The use of the alloys and coatings evaluated in this program will enable the power industry to retrofit the existing fleet of gas turbines with more efficient designs, leading to a natural gas savings of 480 trillion BTU/year.

Company:

Modumetal, Inc.
1443 N. Northlake Way Ste 2B
Seattle, WA 98103

Title:

Functionally Graded Laminated Metal-Ceramic Thermal Barrier Systems by Low-Cost Electrochemical Processing

Summary:

This project seeks to develop coatings combining the toughness of metals with the high temperature resistance and chemical resistance of ceramics.

Company:

NanoSonic, Inc.
1485 South Main Street
Blacksburg, VA 24073

Title:

Ultra High Temperature Environmentally Robust Nanocomposite Thermal Barrier Coatings for Nickel Super Alloy IGCC Turbine Components

Summary:

This project will develop nanocomposite coatings that will significantly enhance efficiency and reduce maintenance requirements for IGCC turbine components. Marketability will be ensured by dynamic applicability to multiple commercial and consumer markets, combined with low materials and application costs.

Company:

Plasma Processes, Inc.
4914 Moores Mill Road
Huntsville, AL 35811

Title:

High Temperature Bond and Thermal Barrier Coatings

Summary:

To improve coal power plant efficiency and reduce greenhouse gas emissions, higher combustion temperatures are needed. Thermal protection systems used in rocket engines will provide the necessary corrosion and thermal protection to power generation turbine components

STTR Project

Company:

Plasma Technology Inc.
1754 Crenshaw Blvd.
Torrance, CA 90501

Title:

Novel Thermally-Sprayed Architectures for High Temperature Thermal Barrier Coating Systems

Summary:

This project will develop advanced thermal barrier coating solutions for improving Integrated Gasification Combined Cycle (IGCC) power plants efficiency.

Company:

Ultramet
12173 Montague Street
Pacoima, CA 91331

Title:

Transpiration-Cooled Turbine Components for High Temperature IGCC Turbines

Summary:

With global demand for electricity increasing and natural resources decreasing, efficient electricity generation is imperative. This project will adapt rocket thrust chamber technology for use in gas turbines to improve the thermal efficiency of power plants by at least 50% in 10 years.

**TOPIC: SENSORS AND CONTROLS FOR FOSSIL ENERGY
POWER GENERATION SYSTEMS**

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Company:

Crossfield Technology, LLC

4505 Spicewood Springs Road
Suite 360
Austin, TX 78759

Title:

Novel Wireless Sensor Integration in Process Control

Summary:

This project seeks to develop a standard package that will enable the use of advanced chemical sensors in harsh environments, such as present in emerging clean coal technology power systems. The standardized package will enable quick implementation of newly developed sensors.

Company:

Electrical Distribution Design, Inc.
311 Cherokee Drive
Blacksburg, VA 24060

Title:

Graph Trace Analysis Based Multidiscipline, Multi-Fidelity, Integrated System Design, Monitoring and Control Analysis and Information Management

Summary:

This project will use Dew software based Graph Trace Analysis (GTA) to develop generation plant modeling for integrated power system design, operations and control. GTA and Dew are currently used by leading utility, academic and government research groups to develop model-based analysis for systems that contain millions of components.

Company:

Luna Innovations Incorporated
1 Riverside Circle
Suite 400
Roanoke, VA 24016

Title:

Harsh Environment Sensor Packaging (Sensor Pack)

Summary:

Housing of fiber optic harsh environment sensors is proposed for universal power generation compatibility. These sensors, once applied to the power industry will enable US energy independence by enabling efficient clean coal and by improving other fossil fuel based power production efficiency.

Company:

Makel Engineering, Inc.
1585 Marauder Street
Chico, CA 95973

Title:

Standardized Sensor Packaging for Harsh Environment

Summary:

This project seeks to develop a standard package that will enable the use of advanced chemical sensors in harsh environments, such as present in emerging clean coal technology power systems. The standardized package will enable quick implementation of newly developed sensors.

Company:

MesoScribe Technologies, Inc.
25 Health Sciences Drive
Stony Brook, NY 11790

Title:

Development of Packaging and Integration of Sensors for On-Line Use in Harsh Environments

Summary:

This project will develop improved sensor packaging techniques for use in advanced power systems. The technology will enable steam turbines, boilers and other critical components to be monitored and operated efficiently to prevent unforced shutdowns, reduce maintenance costs, and reduce emissions.

**TOPIC: HIGH PERFORMANCE MATERIALS FOR FOSSIL ENERGY
POWER GENERATION SYSTEMS**

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Company:

Aegis Technology Inc.
3300 A Westminster Avenue
Santa Ana, CA 92703

Title:

A Reliable High-temperature Sealing Technology for Gas Separation Devices

Summary:

A reliable sealing of ceramic membranes used in high temperature gas separation to the underlying ceramic or metallic support structures is a critical technology essential for high-efficiency, low emission fossil energy conversion systems. The development of the proposed technology will result in a high temperature sealing with long-term stability essential to achieve the potential being anticipated.

Company:

Directed Vapor Technologies International, Inc.
2 Boars Head Lane
Charlottesville, VA 22903

Title:

Surface Modification of Alloys for Ultra-Supercritical Coal-Fired Boilers via Directed Vapor Deposition

Summary:

Advanced coatings are being developed to enable the incorporation of ultra-supercritical coal fired boilers for power production. The result will be significant improvements in the efficiency and cleanliness of converting coal to electricity.

TOPIC: HIGH ENERGY PHYSICS COMPUTER TECHNOLOGY

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Company:

Tech-X Corporation
5621 Arapahoe Avenue
Suite A
Boulder, CO 80303-1379

Title:

QuAI - A Quality Assurance Infrastructure for Data-Centric Applications

Summary:

The proposed system will develop a customizable infrastructure that provides quality assurance in distributed data processing for large HEP and NP experiments and NASA missions.

TOPIC: HIGH ENERGY PHYSICS DETECTORS

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Company:

LightSpin Technologies, Inc.
4407 Elm Street
Chevy Chase, MD 20815

Title:

Radiation Hard GaAs Photomultiplier Chip(TM)

Summary:

This project will develop a new camera able to see every last photon of light. It will help doctors peer into the body to find cancer early, emergency responders find radioactive materials, and physicists probe the composition of matter.

STTR Project**Company:**

Structured Materials Industries
201 Circle Drive North
Unit #102
Piscataway, NJ 20878

Title:

Low-Cost Route to Single Crystal CVD Diamond Detectors

Summary:

Diamond is the ideal material for detectors used in medical radiotherapy, nuclear security and high energy physics. However, the high cost of natural and man-made diamond precludes its use in many of these applications. This project will develop radiation detectors with the high performance of diamond, at substantially lower cost.

TOPIC: HIGH-FIELD SUPERCONDUCTOR AND SUPERCONDUCTING MAGNET TECHNOLOGIES FOR HIGH ENERGY PARTICLE COLLIDERS

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Company:

Fraivillig Technologies Company
98 Charles Street
Boston, MA 02114

Title:

Innovating Insulation for Wind-and-React Superconductor Magnets

Summary:

This project will develop an insulation system that enables the employment of new superconductors in practical devices.

Company:

Global Research and Development
1275 Kinnear Road
Columbus, OH 43212

Title:

High count restacks Nb₃Sn using subelements with over 3000 A/mm² non-Cu J_c at 12T and 4.2K

Summary:

This project will develop a much improved Nb₃Sn superconductor wire for next generation High Energy Physics accelerator magnets.

Company:

Hyper Tech Research, Inc.
1275 Kinnear Road
Columbus, OH 43212

Title:

Development of MgB₂ Current Distribution Systems for High Energy Particle Colliders

Summary:

This project will develop an affordable, high-quality magnesium diboride superconductor for next generation High Energy Physics accelerator magnets and components.

Company:

Hyper Tech Research, Inc.
1275 Kinnear Road
Columbus, OH 43212

Title:

Internal-Tin Nb/Sn strand with distributed barrier that will not leak Sn during heat treatment

Summary:

This project will develop a much improved Nb₃Sn superconductor wire for next generation High Energy Physics accelerator magnets.

Company:

Metal Oxide Technologies Inc.
8807 Emmott Rd., Suite 100
Houston, TX 77040

Title:

High-Field YBCO Superconductors for High Energy Particle Colliders

Summary:

A reliable, commercially viable superconducting wire which operates without electrical loss will benefit not only high energy physics fundamental research, but also: industry development and economic growth; the environment by reducing the consumption of politically unstable fossil fuel; and government and military mission critical programs.

STTR Project**Company:**

Muons, Inc.
552 N. Batavia Avenue
Batavia, IL 60510

Title:

High Field YBCO Magnet Technology for Muon Cooling

Summary:

High-temperature superconducting wire is being developed to operate at low temperature for extremely high field magnets for particle accelerators and Nuclear Magnetic Resonance.

Company:

Shear Form, Inc.
207 Dellwood Road
Bryan, TX 77801

Title:

Engineered Dual NbTa Barriers for Higher J_c Nb₃Sn Superconductors

Summary:

In order to achieve a higher current carrying capacity in Nb₃Sn superconductors, it is advantageous to incorporate a highly deformable tantalum layer to protect adjacent stabilizing copper from tin contamination. Improved properties in the tantalum are realized by using fine grained tantalum backed by fine-grained ductile niobium. This project will demonstrate improved ductility in specially fabricated dual niobium-tantalum layer for use in advanced Nb₃Sn superconductors. This work will lead to higher field and lower cost superconducting magnets for high energy physics applications, than are currently possible.

Company:

Supercon, Inc.
830 Boston Turnpike
Shrewsbury, MA 01545-3386

Title:

High Performance Nb₃Sn Conductor Fabricated by the Internal Tin Tube Method with NbTi Island Doping to Assist in Filament Reaction

Summary:

A superconducting wire will be developed for use in magnets for high energy physics accelerators. This wire will also find use in high frequency nuclear magnetic resonance imaging systems used in cutting edge chemical applications.

Company:

Supercon, Inc.

830 Boston Turnpike
Shrewsbury, MA 01545-3386

Title:

A Modified Internal Tin Tube Nb3Sn Conductor for Higher Non-Copper Critical Current Density

Summary:

This project will attempt to increase the performance, of Nb3Sn conductors in order to attain the required high magnetic fields utilizing a novel materials

Company:

SupraMagnetics, Inc.
214 Canal Street
Plantsville, CT 06479

Title:

A Multifilament PIT V3Ga Conductor for HEP Magnet Applications

Summary:

The High Energy Physics (HEP) research field employs high energy particle colliders to verify quantum theory, the existence of proposed subatomic particles, and theories of the origin of our universe. This project will develop and demonstrate an effective multifilament V3Ga conductor by the multi-filament powder-in-tube process to achieve higher, more consistent critical current density (JC) in higher magnetic fields (15T - 20T) and increased strain resilience.

Company:

SupraMagnetics, Inc.
214 Canal Street
Plantsville, CT 06479

Title:

A Novel Quaternary Low-Cost PIT Nb3Sn Conductor for HEP Magnet Applications at 15 Tesla and Beyond

Summary:

A new economical Nb3Sn superconductor with advanced performance will be developed for high field magnets utilized in high energy physics research, fusion machines, and MRI and NMR instruments for the general benefit of the public.

**TOPIC: ACCELERATOR TECHNOLOGY FOR THE
INTERNATIONAL LINEAR COLLIDER**

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Company:

Calabazas Creek Research, Inc.
690 Port Drive
San Mateo, CA 94404-1010

Title:

10 MW L-Band Klystron for Accelerators

Summary:

This project will develop a 10 MW, 1.3 GHz annular beam klystron. The advanced design of the ABK is offers system costs that are significantly lower than those possible with conventional klystrons. The ABK will be useful for research and medical accelerators, and national defense and commercial applications.

Company:

Euclid TechLabs, LLC
5900 Harper Road #102
Solon, OH 44139

Title:

A New Quarter-Wave Coaxial Coupler For 1.3 GHz Superconducting Cavity

Summary:

This project will develop new and more efficient techniques for providing energy to a superconducting accelerator.

Company:

Niowave, Inc.
1012 N. Walnut Street
Lansing, MI 48906

Title:

Fabrication of Niobium Cavities Directly from Large Grain Ingot

Summary:

This project will develop a new fabrication method to form superconducting linear accelerator components directly from niobium large grain ingot to greatly reduce the material and fabrication costs. This research would lead to broader use of superconducting linear accelerator technology.

Company:

Omega-P, Inc.
258 Bradley Street
New Haven, CT 06510-1106

Title:

RF Cavity Chain and Magnetic Circuit for a 10-MW, 1.3-GHz, Low-Voltage, Multi-Beam Klystron

Summary:

This project will develop high-power multi-beam klystrons that should lower cost and complexity for a future electron-positron collider, and also open up commercial applications with improved clinical accelerators and industrial processors.

Company:

Omega-P, Inc.
258 Bradley Street
New Haven, CT 06510-1106

Title:

Electron Gun and Beam Collector for a FOR A 10-MW, 1.3-GHz, Low-Voltage, Multi-Beam Klystron

Summary:

Progress in elementary particle high-energy physics depends on the evolution of technology to enable future machines to operate at higher energies than can be reached at present. The high-power multi-beam klystrons to be developed should lower cost and complexity for a future electron-positron collider.

TOPIC: ADVANCED CONCEPTS AND TECHNOLOGY FOR HIGH ENERGY ACCELERATORS

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Company:

Calabazas Creek Research, Inc.
690 Port Drive
San Mateo, CA 94404-1010

Title:

A 200 MHz 35 MW Multiple Beam Klystron for Accelerator Applications

Summary:

Successful development of a high power multiple beam klystron would provide an RF source for powering several accelerator systems desired at frequencies around 200 MHz. The proposed source would find applications in the United States, Europe, and Asia.

STTR Project**Company:**

Calabazas Creek Research, Inc.
690 Port Drive
San Mateo, CA 94404-1010

Title:

Improved Space Charge Modeling of Photoinjectors

Summary:

This project will develop an advanced simulation code for photoinjectors that will help improve high-energy accelerator light-source performance benefiting applied research in biology, materials science and defense/security.

Company:

Euclid TechLabs, LLC
5900 Harper Road #102
Solon, OH 44139

Title:

A Compact Electronics Module for the Small Accelerator Facility: a Measurement System for Charge, Position, and RF Phase

Summary:

This project will design and test a multifunction electronic readout unit that will allow measurement of particle beam position, intensity and phase. The unit will be inexpensive enough to be used at small accelerator facilities.

Company:

Euclid TechLabs, LLC
5900 Harper Road #102
Solon, OH 44139

Title:

Numerical Algorithms for Dispersive, Active, and Nonlinear Media with Applications to the Paser

Summary:

This project will develop advanced computational techniques for microwave and optical materials. This project will allow improved modeling of a class of new particle acceleration techniques.

STTR Project**Company:**

Go AI Services
1088 Dartmouth Lane
Los Altos, CA 94024

Title:

Lattice Element Error Solver for Modeling of Accelerators, Storage Rings, Transport Systems and Insertion Devices

Summary:

Analytical tools that can be used to efficiently resolve accelerator errors in U.S. synchrotron light sources (or high-brightness X-ray laboratories) will increase the up-time of those complex facilities which currently serve thousands of users

from all scientific and engineering fields. This project will develop a tool that is based on a new method to solve complex equations in a simplified way. The developed tool also has many commercial applications, e.g., as a math-solution software toolkit and as a solver for complex engineering systems.

Company:

Incom Inc.
P.O. Box G
Southbridge, MA 01550-0528

Title:

Development of Photonic Band Gap Structures for Particle Acceleration

Summary:

To probe deeper into the most fundamental structure of matter, high-energy physics needs shorter wavelengths and higher energies at much lower cost. The miniature photonic-bandgap accelerator has the potential to increase power and performance drastically at a fraction of the cost of conventional systems. This revolutionary generation of accelerators will spawn breakthroughs in many fields including high-energy physics, industrial measurement and technology, and medical research and diagnostics.

Company:

MagiQ Technologies
11 Ward Street
Somerville, MA 02143

Title:

Real Time Optical Network for Pulsed-Accelerator Control

Summary:

This project will develop a fiber optic-based synchronization and communication system for control of next-generation pulsed accelerators. MagiQ's existing product, a quantum key distribution system, will be modified and further developed for this and other advanced applications.

Company:

Muons, Inc.
552 N. Batavia Avenue
Batavia, IL 60510

Title:

Quasi-Isochronous Muon Collection Channels

Summary:

Beams of muons would have many commercial and scientific uses if the disadvantage of their short lifetime can be overcome. New ways to collect large numbers of muons and to form them rapidly into bright beams are being developed for many applications, including a muon collider at the energy frontier.

Company:

Omega-P, Inc.
258 Bradley Street
New Haven, CT 06510-1106

Title:

Coaxial Two-Channel Dielectric Wake Field Accelerator

Summary:

Progress in elementary particle high-energy physics depends on the evolution of technology to enable future machines to operate at higher energies than can be reached at present. This project will develop high-gradient cavities to allow structures to sustain higher electric fields without breakdown, thus enabling operation at higher energy, and also opening up commercial applications with improved clinical accelerators.

Company:

Particle Accelerator Corporation
809 Pottawatomie Trail
Batavia, IL 60515-2609

Title:

Non-Scaling H-FFAG Accelerator for HEP and Medical Applications

Summary:

The development of broad, highly-accurate accelerator models with powerful optimization tools and user-friendly interfaces will enhance not only the HEP program but also benefit established and future applications of accelerators in science, technology, and medicine ranging from treatment of cancers, radiopharmaceuticals, and medical isotope production to secondary production beams for material science and basic research in nuclear physics.

Company:

Particle Beam Lasers, Inc.
18925 Dearborn Street
Northridge, CA 91324-2807

Title:

Design of a Demonstration of Magnetic Insulation and Study of its Application to Ionization Cooling for a Muon Collider

Summary:

This project will design the first experiment to observe the novel concept of radio-frequency magnetic insulation, allowing vacuum radio-frequency acceleration in magnetic fields without damage. This is essential for producing intense cold muon beams for use in a Muon Collider. Commercial applications might include muon radiography for medical and homeland security applications, intense sources of muons for condensed matter studies, and nanotechnology.

Company:

RadiaBeam Technologies, LLC
13428 Beach Avenue
Marina Del Rey, CA 90292-5624

Title:

An Inexpensive High Brightness Photoinjector using Solid Freeform Fabrication (SFF)

Summary:

This project will develop a high average power electron gun to be manufactured with innovative, cost cutting, techniques. This promises to be a key enabling technology for imaging and analysis applications of interest to homeland security as well as industrial and academic programs.

Company:

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title:

Sesquioxide Laser Hosts for Electron Accelerators

Summary:

New, efficient ceramic laser materials, which can provide ultrashort pulses and high power delivery, will be explored to advance accelerator technology. These lasers will replace the current systems, which are highly energy inefficient.

Company:

SVT Associates, Inc.
7620 Executive Drive
Eden Prairie, MN 55344

Title:

Robust GaN-Based Photocathodes for High-Current RF Electron Injectors

Summary:

Advanced high-intensity electron guns, used as injectors in electron accelerators, utilize photocathodes as electron source. There is an immediate need for the development of high efficiency photocathodes capable of robust operation at high emission currents. This project is directed toward the development of a GaN-based long-life photocathode for application in high-current electron guns.

Company:

Tech-X Corporation
5621 Arapahoe Avenue
Suite A
Boulder, CO 80303-1379

Title:

Design of Meter-Scale Laser Wakefield Accelerators

Summary:

Future generation high-energy particle accelerators, used to study the fundamental nature of matter, will likely include plasma-based components. Existing software is being enhanced to enable the accurate simulation and design of such devices in less than 1/100th the time.

Company:

Tech-X Corporation
5621 Arapahoe Avenue
Suite A
Boulder, CO 80303-1379

Title:

Design and Fabrication of Three-Dimensional Photonic Crystal Accelerator Structures

Summary:

Future generations of high-energy particle accelerators, used to study the fundamental nature of matter, will likely be powered with lasers. This project will develop component designs to enable the integration of multiple accelerator components in a single microfabricated structure-an "accelerator on a chip."

Company:

Tech-X Corporation
5621 Arapahoe Avenue
Suite A
Boulder, CO 80303-1379

Title:

Magnetic Insulation and the Effects of External Magnetic Fields on RF Cavity Operation in Muon Accelerators

Summary:

Muon colliders require high-gradient RF cavities operating in strong magnetic fields, a condition which focuses damaging surface-emitted electrons to small areas on the cavity surface. This project will develop simulation tools to assist in designing RF cavities for operation in strong magnetic fields with reduced surface damage and breakdown.

TOPIC: RADIO FREQUENCY ACCELERATOR TECHNOLOGY FOR HIGH ENERGY ACCELERATORS AND COLLIDERS

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Company:

Advanced Energy Systems, Inc.
27 Industrial Blvd. Unit E
Medford, NY 11763-2286

Title:

Prototype 800MHz Crab Cavity Development

Summary:

At the collision point for most high energy physics colliding beam accelerators, some fraction of the particles do not collide with particles in the oncoming bunch due to the relative angle of the bunches at the collision point. Crab cavities "twist" the beam, increasing the number of particles which collide.

STTR Project**Company:**

Calabazas Creek Research, Inc.
690 Port Drive
San Mateo, CA 94404-1010

Title:

Analysis Code for High Gradient Dielectric Insulator Surface Breakdown

Summary:

This project will allow analysis of electrical breakdown on dielectric surface that increases the cost and reduce reliability of high power devices for high energy physics, defense, medical, and industrial applications. Successful development will allow design of more cost effective high power devices with increased reliability.

Company:

Euclid TechLabs, LLC
5900 Harper Road #102
Solon, OH 44139

Title:

Ferroelectric Based High Power Components for L-Band Accelerator Applications

Summary:

This project will develop a new electronic device to optimize the power in particle accelerators. The key component is a bar of a "smart" material that changes its properties with an applied electric field.

STTR Project**Company:**

Niowave, Inc.
1012 N. Walnut Street
Lansing, MI 48906

Title:

Development of a 400 MHz Superconducting RF Crabbing Cavity

Summary:

This project will develop superconducting crabbing cavities. The goal of this research is to develop a cavity that will satisfy the requirements of the Large Hadron Collider luminosity upgrade.

STTR Project**Company:**

Omega-P, Inc.
258 Bradley Street
New Haven, CT 06510-1106

Title:

Anti-Breakdown Coatings for High-Gradient Accelerator Structures

Summary:

Progress in elementary particle high-energy physics depends on the evolution of technology to enable future machines to operate at higher energies than can be reached at present. The high-gradient cavities to be developed in this project are to allow structures to sustain higher electric fields without breakdown, thus enabling operation at higher energy, and also opening up commercial applications with improved clinical accelerators.

Company:

Omega-P, Inc.

258 Bradley Street
New Haven, CT 06510-1106

Title:

Multi-Mode Cavity Design for Raising RF Breakdown Threshold in a Two-Beam High-Gradient Accelerator

Summary:

This project will develop high-gradient cavities to allow structures to sustain higher electric fields without breakdown, thus enabling operation at higher energy, and also opening up commercial applications with improved clinical accelerators.

Company:

Physical Optics Corporation
20600 Gramercy Place
Building 100
Torrance, CA 90501-1821

Title:

Composite Energy Storage Capacitor

Summary:

The problem with existing pulsed high electric energy density storages is that high capacity is achievable at low voltage and vice versa. The proposed multi-component nanocomposite allows achieving high electric capacity at high voltage.

Company:

RadiaBeam Technologies, LLC
13428 Beach Avenue
Marina Del Rey, CA 90292-5624

Title:

Ultra-High Gradient, Compact S-Band Accelerating Structure for Laboratory and Industrial Applications

Summary:

This project will develop an industrially available accelerator, which can achieve higher gradient than competing technologies. Such a device will find numerous applications in the areas of medicine, industry, homeland security, and basic research.

Company:

Sci-Eng Solutions, LLC
3304 Lake Town Drive
Columbia, MO 65203-6719

Title:

Neutron Transmutation Doped Silicon Carbide Switches

Summary:

This project will develop and deploy fast solid state switches that will address current and future problems requisite to the International Linear Collider kicker systems. Variations on these solid state switches will address numerous other crucial military and commercial applications; such as directed energy weapons, particle beam accelerators, high speed rail systems, lasers, and advanced radars.

Company:

Simulation Technology and Applied Research, Inc.
11520 North Port Washington Road
Suite 201
Mequon, WI 53092-3432

Title:

An Improved 2D Eigensolver for RF Cavity Design

Summary:

This project will develop software that will allow for more rapid evaluation and design iteration for components in next generation light sources and particle colliders, reducing the cost of these components.

Company:

Simulation Technology and Applied Research, Inc.
11520 North Port Washington Road
Suite 201
Mequon, WI 53092-3432

Title:

Robust and Efficient Dark Current Modeling on Finite-Element Meshes

Summary:

Improved software for dark current modeling will lower development costs of components for next-generation accelerators such as the International Linear Collider. Better software will also enable more rapid design of high-power microwave tubes, helping the U.S. microwave tube industry compete in a worldwide marketplace.

Company:

TPL, Incorporated
3921 Academy Parkway North NE
Albuquerque, NM 87109

Title:

Nanocomposite Film Capacitors for High Energy Accelerators

Summary:

This project will reduce the size of energy storage devices used in high power electronics. Successful results could benefit applications in the defense, energy, and power electronics industries.

Company:

Ultramet
12173 Montague Street
Pacoima, CA 91331

Title:

Economical Manufacture of Seamless High-Purity Niobium

Summary:

This project will develop an efficient, cost-effective means of fabricating solid ultrahigh-purity niobium superconducting radio frequency cavities that will be suitable for particle accelerators with broad applications ranging from medical treatment to high-energy physics.

TOPIC: IMAGING, RADIOCHEMISTRY, AND ARTIFICIAL RETINA

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Company:

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title:

Next Generation SPECT Detectors

Summary:

This project will investigate a novel detector technology that will be very useful in medical imaging. It will also be useful in other scientific studies (such as high energy physics and space research) as well as commercial applications (such as oil exploration, medical imaging, and non-destructive evaluation).

Company:

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title:

Novel Photon Counting Detector for Small Animal SPECT/MRI

Summary:

A small animal SPECT/MRI scanner using the proposed detector technology will have far better performance than current dual-modality techniques in use, and will bring the power of non-invasive functional imaging to detailed studies of the mouse and rat. Such a tool will be of great importance in understanding biological functions and facilitate rapid progress in new drug developments.

Company:

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title:

Ultra-Fast, Bright Scintillators for PET

Summary:

This project will investigate a novel detector technology that will be very useful in medical imaging systems. It will also be useful in other scientific studies (such as particle and high energy physics and space research) as well as other applications (such as oil exploration and nuclear non-proliferation).

Company:

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title:

Dual Modality Small Animal Imaging

Summary:

This project will investigate a promising detector technology, which will have major impact in scientific studies, health care, homeland defense, oil exploration as well as industrial applications.

Company:

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title:

New Detectors for Small Animal SPECT

Summary:

This project will investigate a promising nuclear detector material which will have major impact in scientific studies, medical imaging, homeland defense, oil exploration as well as industrial applications

Company:

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title:

High Performance, Low Cost Scintillators for PET

Summary:

This project will investigate promising nuclear detector materials that will have major impact in medical imaging, physics, homeland security, scientific studies as well as commercial applications.

TOPIC: GENOMES-TO-LIVE (GTL) AND RELATED BIOTECHNOLOGIES

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Company:

ChromoLogic, LLC
133 N. Altadena Drive
#307
Pasadena, CA 91107

Title:

Label-Free In-Situ Biofilm Analysis(LIBA) System

Summary:

This project will develop an instrument that will revolutionize our understanding of biofilms - leading to their management to better protect our national infrastructure and the engineering of novel biofilms that could reduce global warming (carbon sequestration) and heal our environment (soil remediation).

Company:

ELCRITON
15 Innovation Way
#288
Newark, DE 19711

Title:

Enhancing site-specific chromosomal integration in clostridia

Summary:

Clostridia are anaerobic bacteria that can significantly advance our nation's efforts towards securing renewable biofuels from green technologies. This project will develop new tools for genetically modifying these bacteria, such that superior biofuel producing organisms can be realized in the very near future.

TOPIC: TECHNOLOGIES FOR SUBSURFACE CHARACTERIZATION AND MONITORING

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STTR Project**Company:**

Burge Environmental, Inc.
6100 South Maple Avenue
Suite 114
Tempe, AZ 85283-2872

Title:

In-Situ Monitoring of Iodine-129 in Groundwater Using an Minicolumn

Summary:

This project will develop a field-deployable monitoring system for the cost-effective and rapid determination of radioactive substances in the groundwater at federal sites, such as Hanford Site, Washington. The development of the system will decrease the future cost of site remediation.

Company:

Multi-Phase Technologies, LLC
310 Rebecca Drive
Sparks, NV 89441

Title:

Determining Spectral Properties of Rocks and Sediments from Broadband Electrical/Electromagnetic Data Processing

Summary:

This project will design a method which can characterize subsurface conditions (i.e. permeability) of environmental remediation sites in order to better design remediation systems.

Company:

Novawave Technologies, Inc.
900 Island Drive

Suite 101
Redwood City, CA 94065

Title:

Nanoparticle Enhanced Resonator Sensor for Trace Radionuclide Detection

Summary:

This project will develop a real-time metal enhanced fluorescence detection system that has the potential to impact significantly the ability scientists to track sub-surface radionuclide and metal migration to prevent widespread ecological contamination from aging radiological stores. In addition, the technology can be adapted for homeland security applications, particularly safe buildings where office buildings, hospitals, hotels, malls, and schools can be monitored with a distributed sensor network.

TOPIC: CARBON CYCLE MEASUREMENTS OF THE ATMOSPHERE AND THE BIOSPHERE

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Company:

Aerodyne Research, Inc.
45 Manning Road
Billerica, MA 01821-3976

Title:

High Precision COS Monitor to Constrain the Partitioning of CO₂ Fluxes

Summary:

To better understand global climate change, carbon dioxide uptake by vegetation needs to be measured globally. This project will design a novel instrument for carbonyl sulfide which can be used to assess global budgets for CO₂ uptake by plants.

STTR Project

Company:

Aerodyne Research, Inc.
45 Manning Road
Billerica, MA 01821-3976

Title:

An Absolute CO₂ Monitor with Extremely High Accuracy

Summary:

To better understand global climate change, carbon dioxide needs to be measured globally and accurately. This project will design a novel, commercial monitor with unsurpassed accuracy and unique capability to be deployed worldwide.

Company:

Novawave Technologies, Inc.
900 Island Drive
Suite 101
Redwood City, CA 94065

Title:

Real-Time Ambient Nitrous Oxide Sensor

Summary:

The proposed instrument will enable nitrous oxide levels to be monitored with high precision and accuracy. Nitrous oxide is the third most important greenhouse gas behind carbon dioxide and methane. The ability to obtain these measurements using low cost, rugged hardware is essential for obtaining a greater understanding of global warming and climate change.

Company:

Physical Sciences Inc.
20 New England Business Center
Andover, MA 01810

Title:

Field Worthy Sensor for Measurements of the Stable Isotope Ratio of CO₂

Summary:

Predictions of global climate change rely on models incorporating precise knowledge of the sources and sinks of important greenhouse gases such as CO₂. Measurements using the high sensitivity instrument for monitoring the major stable isotopes of CO₂ that this project will develop and demonstrate can be used to decrease the uncertainties that still remain.

Company:

Physical Sciences Inc.
20 New England Business Center
Andover, MA 01810

Title:

Highly Compact CO₂ Sensor for Balloon Deployment

Summary:

Policy decisions relating to energy utilization are based on predictions from models of global climate change, which in turn rely on the accuracy of measurements of various trace species in the atmosphere. This project will develop and demonstrate a sensor for routine monitoring of CO₂ from balloons.

STTR Project

Company:

Physical Sciences Inc.
20 New England Business Center
Andover, MA 01810

Title:

Development of a Fieldable Soil Carbon Monitor

Summary:

This project will develop a small, rugged and fieldable monitor for soil carbon. The overall goal of the program is to establish feasibility of a detector that will help assess management strategies for the sequestration of carbon dioxide in soil.

Company:

Picarro, Inc.
480 Oakmead Parkway
Sunnyvale, CA 94085

Title:

Hand-Held, Battery Operated Trace Gas Analyzer For Measuring GHG Sources

Summary:

Measurement of methane from landfills provide critical information related to greenhouse gases and global warming as well as much needed information to help regulate emissions from landfills and for assigning a cost for the carbon emission (or conversely a credit for its recovery).

Company:

Searchlight Sensors, Inc.
1100 N. Tustin Avenue
Suite G
Santa Ana, CA 92705-3509

Title:

Low Cost Balloon-Borne Carbon Dioxide Sensor

Summary:

This project will develop a low cost carbon dioxide sensor that can be operated by battery on weather balloon. This sensor will help to understand the global warming process much more quantitatively and in global scale.

Company:

Southwest Sciences, Inc.
1570 Pacheco Street
Suite E-11
Santa Fe, NM 87505-3993

Title:

Differential Absorption DIALApparatus for CO₂ Flux Measurement

Summary:

This project will investigate a compact, rugged laser source for quantifying the uptake of carbon dioxide by forests and other ecosystems.

TOPIC: ATMOSPHERIC MEASUREMENT TECHNOLOGY

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Company:

Aerodyne Research, Inc.
45 Manning Road
Billerica, MA 01821-3976

Title:

Development and Characterization of a Compact Aerosol Chemical Speciation Monitor (ACSM)

Summary:

Small airborne particles generated from energy-related activities can adversely impact global climate, human health, and visibility. This project will develop an instrument with unique capabilities for identifying and measuring the mass loading and chemical speciation of aerosol particles, leading to a better understanding of the sources, transformations and fates of atmospheric particulate matter.

Company:

Aerodyne Research, Inc.
45 Manning Road
Billerica, MA 01821-3976

Title:

Volatility-Resolved Measurements of Total Gas-Phase Organic Compounds by High Resolution Electron Impact Mass Spectrometry

Summary:

This project will develop an instrument with unique capabilities for identifying and measuring the organic precursors of aerosol particles, leading to a better understanding of the sources, transformations and fates of atmospheric particulate matter.

Company:

Jerry L. Berndt DBA, JB Enterprises
234 N. 38th Avenue
Yakima, WA 98902

Title:

Oxygen A-Band Spectrometer

Summary:

This project will improve our understanding of cloud-radiation interaction, and further improve weather and climate forecasts.

Company:

KalScott Engineering Inc.
P.O. Box 3426
Lawrence, KS 66046

Title:

Stabilized Platform for Airborne Instrumentation

Summary:

This project will result in the development and demonstration of stabilized platforms for airborne instrumentation, which will enable highly accurate measurements of atmospheric radiation, which are vital for supporting a strategy of sustainable and pollution-free energy development for the future.

Company:

Physical Optics Corporation
20600 Gramercy Place
Building 100
Torrance, CA 90501-1821

Title:

Cascade Particle Detector

Summary:

This project will develop a cascade particle detector will provide real-time information about particle size distribution in ambient aerosols, which is critical for describing both direct and indirect radiative forcing by aerosols present in the atmosphere.

Company:

Scientific Solutions, Inc.
55 Middlesex Street
Unit 210
North Chelmsford, MA 01863-1561

Title:

FABSOAR - A Fabry-Perot Spectrometer for Oxygen A-Band Research

Summary:

This project will develop an high-resolution spectrometer to analyze light from the sky to determine the degree to which solar radiation is being absorbed by clouds and other aerosols. Since this radiation is an important driver of many atmospheric processes, understanding it thoroughly is crucial to climate knowledge.

TOPIC: NUCLEAR PHYSICS ACCELERATOR TECHNOLOGY

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STTR Project**Company:**

Black Laboratories, LLC
12050 Jefferson Avenue
Suite 240
Newport News, VA 23606-4385

Title:

Multilayer ALD Films for SRF Cavities

Summary:

Advanced, higher performance particle accelerators are needed to explore the frontiers of nuclear physics and to gain more widespread use for industrial sciences. This project will develop technology that will allow these to be produced with great gains in efficiency and major reductions in cost.

Company:

Calabazas Creek Research, Inc.
690 Port Drive
San Mateo, CA 94404-1010

Title:

An Advanced Simulation Code for Modeling Inductive Output Tubes

Summary:

This project will develop a new design tools for inductive output tubes. This will provide higher efficiency RF sources for driving high energy accelerators.

Company:

Euclid TechLabs, LLC
5900 Harper Road #102
Solon, OH 44139

Title:

Nonlinear Ferroelectric Development for L-Band Accelerator Applications

Summary:

This project will develop a new electronic device to control the power in particle accelerators. The key component is a ring of a "smart" material that changes its properties with an applied electric field.

Company:

FAR-TECH, Inc.
3550 General Atomics Court
Building 15, Suite 155
San Diego, CA 92121

Title:

An Energy-Efficient Klystron Upgrade for the Jefferson Laboratory CEBAF Linac

Summary:

High-power radio frequency (RF) sources are used to power the majority of particle accelerators used research, military, industrial and medical applications. This project will provide a high-efficiency RF source for Thomas Jefferson National Accelerator Laboratory, with the basic technology also usable for many other future projects.

Company:

FAR-TECH, Inc.
3550 General Atomics Court
Building 15, Suite 155
San Diego, CA 92121

Title:

Modeling Tool for Optimizing Electron Beam Ion Sources

Summary:

This project will develop a sophisticated, numerical modeling tool that will decrease the cost of building and operating sources of highly charged ions that are used in nuclear physics research as well as industrial applications.

Company:

FAR-TECH, Inc.
3550 General Atomics Court
Building 15, Suite 155
San Diego, CA 92121

Title:

Model for Heating of Electron Cyclotron Resonance Ion Sources

Summary:

This project will develop a sophisticated, numerical modeling tool that will decrease the cost of building and operating sources of highly charged ions that are used in nuclear physics research as well as industrial applications.

Company:

FM Technologies, Inc.
4431-H Brookfield Corporate Drive
Chantilly, VA 20151-1691

Title:

Chemical Free Surface Processing for High Gradient Superconducting RF Cavities

Summary:

This project will develop a new process that will enhance quality of the superconducting radio-frequency cavities and allow acceleration of charged particles to much higher energies. The process also will improve the cavity manufacturing and result in substantial cost reduction of superconducting radio-frequency high-energy particle accelerators.

Company:

Faraday Technology, Inc.
315 Huls Drive
Clayton, OH 45315

Title:

Electrically Mediated Deposition of Niobium for Coating Copper Elliptical Cavities

Summary:

There is a need for an innovative process that is capable of coating niobium metal onto the interior surface of copper cavities used in superconducting particle accelerators. Continued support of research in the area of superconducting radio frequency applications could lead to new commercial applications in the medical, energy and national security industries.

Company:

Green Mountain Radio Research Company

77 Vermont Avenue
Colchester, VT 05446

Title:

Development of High-Efficiency Power Amplifiers for 704 MHz

Summary:

Accelerators used by DOE for nuclear-physics research require huge amounts of electrical power. This project will develop high-efficiency power amplifiers that will significantly reduce electricity consumption, thus reducing operating costs, importation of foreign petroleum, pollution, and greenhouse-gas emissions.

Company:

Green Mountain Radio Research Company
77 Vermont Avenue
Colchester, VT 05446

Title:

Development of High-Efficiency Power Amplifiers for 50 - 350 MHz

Summary:

This project will develop high-efficiency power amplifiers that will significantly reduce electricity consumption, thus reducing operating costs, importation of foreign petroleum, pollution, and greenhouse-gas emissions.

STTR Project

Company:

Muons, Inc.
552 N. Batavia Avenue
Batavia, IL 60510

Title:

Phase and Frequency Locked Magnetrons for SRF Sources

Summary:

Highly efficient and inexpensive magnetrons, such as those used in kitchen microwave ovens, are being developed to provide the lowest cost microwave sources for a number of diverse applications, including particle accelerators, phased array radars, and sputtering systems.

STTR Project

Company:

Niowave, Inc.
1012 N. Walnut Street
Lansing, MI 48906

Title:

Development of a 499 MHz Superconducting RF Deflecting Cavity

Summary:

This project will develop superconducting deflecting cavities. The goal of this research is to develop a cavity that will satisfy the requirements of Jefferson Laboratory's electron beam upgrade.

Company:

Niowave, Inc.
1012 N. Walnut Street
Lansing, MI 48906

Title:

Development of a Tunable 28 MHz Superconducting RF Cavity for RHIC

Summary:

This project will develop a tunable 28 MHz superconducting accelerating system that would have immediate use in existing nuclear physics research facilities.

Company:

Omega-P, Inc.
258 Bradley Street
New Haven, CT 06510-1106

Title:

Fast Ferroelectric L-Band Tuner for Superconducting Cavities

Summary:

Progress in nuclear physics and elementary particle high-energy physics depends on the evolution of technology to enable future machines to operate at higher particle fluxes and higher energies than can be reached at present. The fast ferroelectric tuners to be developed in this project are to allow accelerator cavities to sustain high accelerating fields despite uncontrolled mechanical vibrations that would otherwise detune the cavities and degrade the accelerator performance.

Company:

Q-Peak, Incorporated
135 South Road
Bedford, MA 01730-2307

Title:

100W Green Laser as a Photoinjector Drive Laser

Summary:

This project will develop a laser that will be one of the key components needed to advance accelerator technology particularly for energy recovery linear accelerators (ERLs) and free-electron lasers (FELs). The laser will also find application in micro machining, two photon microscopy and stereo lithography.

Company:

RadiaBeam Technologies, LLC
13428 Beach Avenue
Marina Del Rey, CA 90292-5624

Title:

A 10 MHz Pulsed Laser Wire Scanner for Longitudinal and Transverse Measurements of 100-mA Class Electron Beams

Summary:

This project is a cost-effective approach to develop a vital diagnostic device, the laser wire scanner (LWS), for high current electron accelerators. A potential benefit of LWS development will be improved design and operation of next generation light sources, as well as high energy accelerators designed to advance the frontier of the fundamental science.

Company:

Saxet Surface Science
3913 Todd Lane
Suite 303
Austin, TX 78744

Title:

Improved Ion Resistance for III-V Photocathodes in High Current Guns

Summary:

Many of the next generation of physics accelerators will require high average electron currents, a potential issue for electron sources. This project will test the possibility for a chemically stabilized surface layer to also inhibit charged particle induced deterioration of these electron sources.

Company:

Tech-X Corporation
5621 Arapahoe Avenue
Suite A
Boulder, CO 80303-1379

Title:

High-Fidelity Modulator Simulations of Coherent Electron Cooling Systems

Summary:

The Relativistic Heavy Ion Collider at Brookhaven National Laboratory is colliding gold ions to create conditions similar to what existed after the big bang. A novel 3-D simulation code is being developed to assist Department of Energy scientists in the design of an electron cooling section that will improve the performance of this premier nuclear physics facility.

Company:

Tech-X Corporation
5621 Arapahoe Avenue
Suite A
Boulder, CO 80303-1379

Title:

Rapid Prediction of Long Range Wakefields for Beam Impedance and Power Loading in Complex Accelerator Structures

Summary:

Design and operation of nuclear physics accelerators is constrained by deleterious effects of extraneous electromagnetic signals (wakefields) within the cavity structures, and these signals are extremely challenging to predict with existing design tools.

TOPIC: NUCLEAR PHYSICS SOFTWARE AND DATA MANAGEMENT

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Company:

MicroContinuum, Inc.
57 Smith Place
Cambridge, MA 02138

Title:

Low-Cost Terabyte and Petabyte Data Storage System

Summary:

Data storage requirements for government agencies, national labs, medical organizations, and businesses are growing at an unprecedented rate. This project will provide a more cost effective, reliable, and energy-efficient means of meeting the growing demand for high capacity permanent storage for these organizations.

Company:

Virkaz Technologies

7305 Weber Street
Atlanta, GA 30349-7919

Title:

CloudSpan: Enabling Scientific Computing Across Cloud and Grid Platforms

Summary:

Grid computing has been established within the Nuclear Physics community as paradigm for data sharing and computational analysis on a massive scale. Cloud computing has recently emerged as a paradigm in which users lease the resources required to maintain and create virtual storage and computational elements in shared hosting environment. This project will develop an infrastructure that allows users to execute their scientific applications seamlessly in either environment.

TOPIC: NUCLEAR PHYSICS ELECTRONICS DESIGN AND FABRICATION

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Company:

Voxtel, Inc.
12725 SW Millikan Way
Suite 230
Beaverton, OR 97005

Title:

Rad-Hard SOI CMOS Active Pixel Sensor for Charged Particle Detection

Summary:

This project will enable planned Nuclear Physics science by developing and demonstrating a SOI (silicon-on-insulator) CMOS direct conversion particle detector. Development of this technology will allow production of radiation-hardened pixel sensors which are thin (<15- μm), have excellent and well controlled charge collection using fully depleted devices, and can use full CMOS readout without parasitic charge collection.

**TOPIC: NUCLEAR PHYSICS INSTRUMENTATION,
DETECTION SYSTEMS AND TECHNIQUES**

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Company:

Applied Nanotech, Inc.
3006 Longhorn Blvd., #107
Austin, TX 78758-7518

Title:

Carbon Stripper Foil for the Next Generation Rare Isotope Beam Facility

Summary:

This project will develop a large-area, low-cost stripper foil, a key component needed for the next generation of the Rare Isotope Accelerator. Experiments from this accelerator will lead to a comprehensive description of nuclei and establish the scientific foundation for innovative applications of nuclear science to society.

STTR Project

Company:

I.C.Gomes Consulting & Investment Inc.
1728 Killdeer Dr.
Naperville, IL 60565

Title:

Development of Thin Refractory Actinide Plates for High Power RIB Targets

Summary:

This project will develop fabrication techniques of high density, fast release thin plates of refractory actinides to be used in targets for advanced nuclear physics studies at rare isotope beam facilities. These plates will allow the construction of targets to produce beams of short lived isotopes due to its fast release characteristic increasing the range of application for rare isotope facilities and also they can be used in other applications such as radioisotope production for medical and other applications.

Company:

PHDs Co.
777 Emory Valley Road
Suite B
Oak Ridge, TN 37830

Title:

Segmented Rectifying and Blocking Contacts on Germanium Planar Detectors

Summary:

The Department of Energy Office of Nuclear Physics has a fundamental need for more sensitive, reliable, and cost effective instruments for the detection of gamma rays in Nuclear Physics experiments. This project will develop detector fabrication techniques that will provide the basis for these detectors.

Company:

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title:

Bright Selenium Based Quantum Dot Scintillators

Summary:

This project will develop the scintillator that will allow the exploitation of the potential of current state-of-the-art X-ray/gamma-ray detectors used for nuclear physics studies, synchrotron applications, medical imaging, X-ray scanning equipment at airports and border control and detectors for homeland security, and in small animal research, which is so important for the development of new drugs in a rapid and cost-effective manner.

Company:

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title:

Low Cost Large Volume Lanthanide Halide Scintillators

Summary:

This project will permit the rapid and economical manufacturing of spectroscopic quality radiation detector materials that are so critical to addressing the immediate needs of national laboratories and homeland security in rapid and reliable radioisotope identification. Furthermore, the proposed developments will have a profound impact on civilian sector applications such as X-ray/gamma ray detection in medical diagnostics and small animal research, which is so important to healthcare and new drug development.

Company:

SVT Associates, Inc.
7620 Executive Drive
Eden Prairie, MN 55344

Title:

Advanced Coating Technology for Enhanced Performance of Microchannel Plates for High-efficiency UV and Cherenkov Light Detection

Summary:

This project will develop an advanced coating technology to enhance performance of MCP based UV detectors for next generation Cherenkov detectors in nuclear physics application.

Company:

Tech-Etch, Inc.
45 Aldrin Road
Plymouth, MA 02360-4803

Title:

Commercial and Cost Effective Production of Two Dimensional Read-Out Boards for Subatomic Particle detectors

Summary:

Readout boards are used in the detection of subatomic particles. Advancements are necessary to further discoveries of the subatomic universe, and to develop techniques for medical imaging, nuclear nonproliferation and homeland security applications.

Company:

XIA, LLC
31057 Genstar Road
Hayward, CA 94544

Title:

Improved Energy Resolution in CsI Scintillator Material

Summary:

Scintillation detectors are widely used in nuclear physics, medical imaging, and homeland security applications. This project will improve the energy resolution of the common bright scintillator CsI by a factor of 3, vastly extending its detection sensitivity and utility in these areas.

TOPIC: SOFTWARE LIBRARIES AND APPLICATIONS MAINTENANCE AND SCALING TO PETASCALE

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Company:

RNET Technologies, Inc.
240 West Elmwood Drive
Suite 2010
Dayton, OH 45459

Title:

Optimization of the PETSc Library for Clusters of MultiCore Processors

Summary:

Many science applications rely on libraries such as PETSc. Emerging supercomputers require modifications to these applications and libraries to fully utilize these supercomputers. The tools developed by this project would provide a cost effective mechanism to perform these modifications for a wide range of commercial and government applications.

Company:

Simmetrix, Inc.
10 Halfmoon Executive Park Drive
Clifton Park, NY 12065-5630

Title:

Interoperable Components to Support Unstructured Mesh Simulations on Massively Parallel Computers

Summary:

This project will support the reliable automatic generation and control of the computer representations used by software to perform complex physical simulations. These tools will execute automatically in seconds to minutes of computer time thus eliminating the hours to months of time of experts currently spend on such processes.

Company:

Tech-X Corporation
5621 Arapahoe Avenue
Suite A
Boulder, CO 80303-1379

Title:

Fully Implicit, Jacobian-Free, Newton-Krylov Methods in Production Level MHD Fusion Codes

Summary:

The DOE's research program on fusion energy depends on computer simulations that can answer research questions at a much lower cost than laboratory experiments. This project will expand the usefulness of these computer simulation tools so that new insights into fusion energy can be obtained at reduced costs.

Company:

Tech-X Corporation
5621 Arapahoe Avenue
Suite A
Boulder, CO 80303-1379

Title:

Extending Chombo with PETSc

Summary:

The most challenging computational physics problems require Adaptive Mesh Refinement (AMR) to resolve fine scale phenomena. This project will extend the leading (AMR) package, Chombo, with the PETSc library, which offers the most comprehensive catalog of sparse matrix solvers.

TOPIC: SCIENTIFIC VISUALIZATION AND DATA UNDERSTANDING

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Company:

Dimension Technologies, Inc.
315 Mt. Read Blvd.
Rochester, NY 14611

Title:

Large Autostereoscopic Multiview 2D/3D Switchable Desktop Display

Summary:

This project will investigate and model a desktop display that can produce high resolution 3D images which can be viewed without 3D glasses by groups of scientists viewing complex multi dimensional data sets or simulations. These displays could also be used in conference rooms and eventually the home.

Company:

Kitware, Inc.
28 Corporate Drive
Clifton Park, NY 12065

Title:

Multi-Resolution Streaming for Remote Scalable Visualization

Summary:

This project will develop advanced software tools for the visual analysis of large data. These tools enable remote viewing of large data stores, thereby eliminating the need to move data between computer systems, and allowing users to access geographically remote computing centers.

Company:

NorthWest Research Associates, Inc.
4118 148 Avenue NE
Redmond, WA 98052

Title:

Dissemination of Climate Model Output to the Public and Commercial Sector

Summary:

The National Weather Service (NWS) provides weather forecasts (extended for several days into the future) and an entire industry has grown based on taking NWS forecasts, and repackaging, interpolating, and providing other processing services for their customers. This project will take the latest state of the art climatological model forecasts, and perform a similar value-added processing, and deliver them to the general public in their preferred format.

TOPIC: HIGH PERFORMANCE NETWORKS

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Company:

Acadia Optronics, LLC
1395 Piccard Drive
Suite 210
Rockville, MD 20850

Title:

Software Management, Distribution, and Support for ESnet Network Provisioning Tools

Summary:

This project will provide a management, distribution, and support infrastructure for network provisioning tools.

Company:

Acadia Optronics, LLC
1395 Piccard Drive
Suite 210
Rockville, MD 20850

Title:

Multi-Protocol File Transfer Application For High Performance Networks

Summary:

This project will develop an easy-to-use, high-performance file transfer application suitable for next-generation networks.

Company:

Acadia Optronics, LLC
1395 Piccard Drive
Suite 210
Rockville, MD 20850

Title:

FPGA-Based End-Station Security for High-Performance Networking

Summary:

This project will develop and deploy a high-performance cyber-security platform designed to significantly enhance the security of next-generation networked computing.

Company:

Acadia Optronics, LLC
1395 Piccard Drive
Suite 210
Rockville, MD 20850

Title:

Web 2.0 Based Federated Network Management Environment

Summary:

This project will develop a Web 2.0 based network management environment that will enable efficient collaboration between users and network operators.

Company:

Argo Science Corporation
71 Cypress Way
Rolling Hills Estates, CA 90274-3416

Title:

Hybrid Intrusion Detection System Integrating Anomaly and Signature Detection Methods

Summary:

This novel and unique hybrid intrusion detection system will provide a much needed architecture suitable for defense against cyber-terrorism in ultra-high-speed computer networks. This system will guarantee rapid detection and accurate isolation of attacks with low false alarm rates in large-scale governmental and commercial networks.

Company:

Aries Design Automation, LLC
6157 N. Sheridan Road
Suite 16M
Chicago, IL 60660

Title:

Insider Threat Detection and Response Using Formal Methods

Summary:

The project will result in a powerful model for analysis and detection of insider threats in computer networks. The resulting technology will be of benefit to the DOE, the DOD, as well as all organizations that have to protect high-value information, such as the banking industry, high-tech companies developing expensive Intellectual Property, and civilian government infrastructures.

Company:

Isocore Corporation
12359 Sunrise Valley Drive
Suite 100
Reston, VA 20191-3462

Title:

Developing a Unified MPLS-GMPLS Services Provisioning Tool

Summary:

The unified MPLS-GMPLS provisioning tool built as part of this effort would simplify on-demand creation of optical light paths across multi-domain MPLS-GMPLS network.

Company:

QuickFlex, Inc.
8401 N. New Braunfels
Suite 324
San Antonio, TX 78209

Title:

QuickHydra Network Security System

Summary:

This project will provide secure reconfigurable acceleration for Sentinel Security's Hydra to protect applications and data in high-performance computing and networks.

Company:

RNET Technologies, Inc.
240 West Elmwood Drive
Suite 2010
Dayton, OH 45459

Title:

Enhancement of GridFTP Performance Through GMPLS Integration and Hardware Offloading

Summary:

Data-transfer applications cannot effectively utilize high-performance optical networks. TheGridFTP application improves file-transfer performance, crucial to research projects like the DOE/HEP Large Hadron Collider Computing Grid; this project will implement several improvements; including hardware acceleration and integration of scheduling services to better utilize emerging networks.

Company:

RNET Technologies, Inc.
240 West Elmwood Drive
Suite 2010
Dayton, OH 45459

Title:

NIC-Based Ultra-High-Speed Intrusion Detection System (IDS)

Summary:

Advances in high performance network capabilities and distributed systems technologies are making it easier for large geographically dispersed teams of scientists to collaborate effectively. However, such collaboration will be possible only if the networks are "secure" and resistant to Cyber attack. This project will develop a ultra-high-speed (10 Gigabits/s or higher) Security Software that will resist Cyber attack. This Security software will run on a 10 Gigabit Ethernet "SmartNIC" network card making the Security System highly reliable and robust.

Company:

Telescent Inc.
2118 Wilshire Blvd. #1001
Santa Monica, CA 90403-5704

Title:

Physical Layer Network Management Tools Based on Automated Fiber Optic Patch-Panels

Summary:

This project will develop an advanced fiber optic switching technology that automates the provisioning and testing of fiber optic communications networks. This technology automatically reconfigures, monitors and maps all physical interconnections through network management software, reducing operating costs while improving network efficiency, agility and reliability.

Company:

Telescent Inc.
2118 Wilshire Blvd. #1001
Santa Monica, CA 90403-5704

Title:

RFID Overlay Network for Automated Discovery at the Physical Network Layer

Summary:

This project will develop an RFID overlay network that automates the discovery of the physical network layer forming the foundation of all communication networks. Fiber optic connections are automatically monitored and mapped through

software, reducing the operating cost and downtime, while accelerating service provisioning and improving security and disaster recovery.

TOPIC: SCALABLE SYSTEM SOFTWARE FOR PETASCALE COMPUTER SYSTEMS

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Company:

Accelogic, LLC
609 Spinnaker Ave.
Weston, FL 33326

Title:

Direct Sparse Linear Solver Suite for Mximal Performance FPGA/CPU Heterogeneous Supercomputing - An Enhancement to the Sca/LAPACKrc Library

Summary:

To attain DOE's stated scientific priorities, quantum increases in large-scale computing and simulation speeds are needed. This project will accelerate critical scientific software by providing breakthrough low-cost technology (Extremely-Fast FPGA-Based Direct Sparse Linear Solvers) that can reduce computational times from months to hours, and days to seconds, thus revolutionizing entire industrial design cycles and the way we do science in general.

Company:

FAR-TECH, Inc.
3550 General Atomics Court
Building 15, Suite 155
San Diego, CA 92121

Title:

New 3D Electromagnetic Hybrid Kinetic Adaptive Meshless PICOP Code for Petascale Computer Systems

Summary:

Petascale computing, will eventually impact all scientific and engineering applications, but to reach its full potential, the problems of both hardware and software must be addressed. This project will develop new codes to take advantage of this new level of computing power.

TOPIC: SCALABLE MIDDLEWARE AND GRID TECHNOLOGIES

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Company:

Galois, Inc.
421 SW Sixth Avenue
Suite 300
Portland, OR 97204

Title:

Grid 2.0: Collaboration and Sharing on the Grid

Summary:

This project will implement a Web 2.0 collaboration system based on Grid technologies. Galois' system will allow dispersed scientific teams to collaborate effectively on large amounts of data produced by collections of networked computers.

TOPIC: ADVANCED TECHNOLOGIES AND MATERIALS FOR FUSION ENERGY SYSTEMS

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Company:

HyPerComp Inc.
2629 Townsgate Road
Suite 105
Westlake Village, CA 91361

Title:

Integrated Modeling of Transport Phenomena in Fusion Liquid Metal Flows

Summary:

In liquid metal breeding blankets, fluid flows, heat and mass transfer are tightly coupled. The present effort are directed at developing of multiphase flow codes and supporting physical models capable of addressing the most critical blanket issues, associated with tritium transport and corrosion of structural materials.

Company:

Hyper Tech Research, Inc.
1275 Kinnear Road
Columbus, OH 43212

Title:

High Jc, Low AC Loss Nb₃Sn Superconductor for 14-20T Fusion Application

Summary:

This project will develop a much improved lower cost Nb₃Sn superconductor wire for DOE advanced Fusion Program.

Company:

NEI Corporation
400 Apgar Drive

Suite E
Somerset, NJ 08873

Title:

Functionally Graded Tungsten-Copper Composites for Plasma Facing Components

Summary:

This project will develop advanced materials for use as the internal wall of a fusion power reactor is expected to enable fusion power to be developed as a sustainable source of energy.

Company:

Structured Materials Industries
201 Circle Drive North
Unit #102
Piscataway, NJ 20878

Title:

Optimization of Ultra-Efficient YBCOTape Propduction Tool

Summary:

High temperature superconductors are essential to fusion power development. This project will develop technology to make high-performance superconducting materials cheaper and more readily available, for DOE programs in fusion power, as well as a variety of other scientific, military and commercial applications.

Company:

SupraMagnetics, Inc.
214 Canal Street
Plantsville, CT 06479

Title:

A Multifilament PIT V3Ga Conductor for FUSION Magnet Applications

Summary:

This project will establish the feasibility of a multifilament V3Ga PIT conductor will improve magnet technology for fusion reactors, high energy physics research, MRI and NMR machines for the general public benefit.

Company:

Technology Assessment & Transfer, Inc.
133 Defense Highway
Suite 212
Annapolis, MD 21401

Title:

Joining Plasma Resistant Lanthana Doped W and CuCrZr Alloy Heat Sinks for Use in Nuclear Fusion Applications

Summary:

This project will use cutting edge materials engineering techniques to create nano-structured copper-tungsten joints which reduce the effects the harsh thermal environment seen inside of the ITER fusion reactor on vital components. Using this technology, clean, safe and efficient fusion reactors are closer to being a realized.

Company:

Technova Corporation
3927 Dobie Road
Okemos, MI 48864-3480

Title:

Nanostructuring of Heat Sink Surfaces for Improved Cooling Efficiency

Summary:

Recent advances in the field of nanotechnology will be adapted to address critical thermal management needs in the emerging alternative energy and electronic markets.

Company:

UES, Inc.
4401 Dayton-Xenia Road
Dayton, OH 45432-1894

Title:

YBCO Fibers from Solution Approach - A New Concept

Summary:

A revolutionary approach for superconductor fiber development is proposed for High Temperature Superconductor (HTS) cable fabrication using cost effective solution approach. Advantages of extremely low AC loss and high J_e are expected for multifilament cable fabrication, which will lead to a revolution in HTS industries.

Company:

Ultramet
12173 Montague Street
Pacoima, CA 91331

Title:

Boron-Tungsten Mesh Plasma Facing Components

Summary:

For nuclear fusion to be viable for energy generation, materials must be developed that can withstand the demanding fusion reactor environment. This project will produce a boron-tungsten mesh chamber wall material that will allow high-performance plasma operation in tokamak reactors.

Company:

Ultramet
12173 Montague Street
Pacoima, CA 91331

Title:

Dendritic Engineered Refractory Armor for Fusion Energy Applications

Summary:

Fusion energy is an ideal alternative to fossil fuel energy, providing a greater quantity of environmentally friendly energy than wind, solar, and geothermal sources. Practical application of fusion for efficient electric energy generation requires the development of materials and structures that can withstand the intense radiation resulting from the fusion event within the reactor.

Company:

Ultramet
12173 Montague Street
Pacoima, CA 91331

Title:

Optimization and Simulated Testing of Flow Channel Inserts for Dual-Coolant ITER Test Blanket Modules

Summary:

Nuclear fusion offers a viable means of generating energy sufficient for current consumption levels in a manner consistent with environmental preservation. Existing alternatives to fossil fuels (e.g. wind, solar, geothermal) cannot generate sufficient energy to meet current needs. Practical application of fusion requires the development of materials and structures that allow reliable operation under the demanding reactor environment.

TOPIC: FUSION SCIENCE AND TECHNOLOGY

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Company:

Calabazas Creek Research, Inc.
690 Port Drive
San Mateo, CA 94404-1010

Title:

Development of a 2 MW CW Waterload for Electron Cyclotron Heating Systems

Summary:

High power waterload are necessary to meet the U.S. obligation to the ITER program for fusion energy research. This project will satisfy the ITER requirement and provide a waterload for other fusion facilities around the world.

Company:

Eagle Harbor Technologies, Inc.
Suite D3, #179
Bainbridge Island, WA 98110

Title:

A Robust Modular IGBT Power Supply for Innovative Confinement Concepts

Summary:

This project will develop a robust, cost effective, configurable, solid state power supply that would provide a significant increase in capabilities of currently available power supplies.

Company:

Tech-X Corporation
5621 Arapahoe Avenue
Suite A
Boulder, CO 80303-1379

Title:

Parallel Validation Tools for Fusion Simulations

Summary:

This project will develop software that will standardize and facilitate fusion code validation against experiments. ITER and other fusion experiments will benefit from this work.

Company:

Tech-X Corporation
5621 Arapahoe Avenue
Suite A
Boulder, CO 80303-1379

Title:

Simulations of Alpha Wall Load in ITER

Summary:

In the \$10B International Thermonuclear Experimental Reactor, 100 MW of fusion power is expected to become alpha particle kinetic energy. This project will develop improved simulation software to predict to what extent harmful, residual high-energy alpha particles will reach and strike the reactor wall.

Company:

Virginia Diodes, Inc.
979 Second Street SE
Charlottesville, VA 22902-6172

Title:

Multi-Band Power Source for ITER Reflectometry

Summary:

This project will develop a new generation of millimeter-wave sources with unprecedented output power and frequency agility. These sources will be optimized for use as a diagnostic instrument on ITER, a joint international research and development project that will demonstrate the feasibility of clean and inexpensive fusion energy.

TOPIC: HIGH ENERGY DENSITY LABORATORY PLASMA (HEDLP)

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Company:

HyperV Technologies Corporation
13935 Willard Road
Chantilly, VA 20151

Title:

Plasma Jet Liner Formation

Summary:

This project will develop a novel technology for creating high velocity plasma jets. These jets have many practical applications such as fusion energy, pulsed power, defense, materials science, and space propulsion.

Company:

MSNW, LLC
8551 154th Avenue NE
Redmond, WA 98052

Title:

Macron Formed Liner Compression as a Practical Method for Enabling Magneto-Inertial Fusion

Summary:

A method for creating fusion conditions in a small-scale device is proposed with the potential of greatly simplifying the generation of fusion energy. The results from this research will have broad application to high energy density physics, as well as nuclear waste transmutation and alternate fission fuel cycles.

Company:

Tech-X Corporation
5621 Arapahoe Avenue
Suite A
Boulder, CO 80303-1379

Title:

Plasma Jet Modeling for MIF

Summary:

This project will validate and extend tools developed for use in modeling innovative fusion devices for clean, emission free, power generation.

Company:

Tech-X Corporation
5621 Arapahoe Avenue
Suite A
Boulder, CO 80303-1379

Title:

Simulation of Direct-Drive Magneto-Inertial Fusion

Summary:

The success of DOE-funded magneto-inertial fusion research projects depend on benchmarking computational prediction against experiments. This project will develop numerical models to improve the accuracy of laser-driven magnetic-ux compression simulations.

TOPIC: REMOTE SENSING

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Company:

AdValue Photonics Inc
4585 S. Palo Verde Road
Suite 405
Tucson, AZ 85714

Title:

Long-Wave Infrared Transmitting Single Mode Fiber

Summary:

This project will develop a new class of advanced infrared transparent single mode fiber to meet Department of Energy's demand on new fibers for remote sensing systems currently under development. The remote sensing program has been a cornerstone in the national capability for the detection of proliferation facilities and activities for decades. Such a fiber can also be used for chemical monitoring and deliver IR power for medical application.

Company:

Agiltron, Inc.
15 Cabot Road
Woburn, MA 01801-1003

Title:

Long-Wave Infrared Photonic Band-Gap Fiber

Summary:

Infrared optical fibers are a long sought goal of optical technology, useful for a broad range of military and commercial applications ranging from antimissile countermeasures to laser surgery. The proposed research will lead to the first practical, manufacturable low loss infrared optical fiber for the wavelength band of greatest importance.

Company:

EPIR Technologies, Inc.
590 Territorial Drive
Suite B
Bolingbrook, IL 60440

Title:

HgTe/CdTe Superlattice FTIR Detectors Optimized for the 300-to-1000 cm^{-1} Region

Summary:

This project will use unique new methods in a new technology to develop the first sensitive, high resolution focal plane arrays to image in the very long wavelength infrared, which is necessary for the reliable remote sensing of weapons of mass destruction and of chemical and biological agents.

Company:

Intelligent Optical Systems, Inc.
2520 W. 237th Street
Torrance, CA 90505-5217

Title:

Broadband Infrared Optical Fiber Architecture

Summary:

This optical fiber structure will transport high power optical radiation in the mid infrared region of the spectrum. Traditional silica fibers do not work in this region because they absorb the radiation and overheat, and fail. The proposed fiber will dramatically improve remote sensing instruments.

STTR Project**Company:**

Opto-Knowledge Systems, Inc. (OKSI)
19805 Hamilton Avenue
Torrance, CA 90502

Title:

Single Mode Hollow Core Waveguides for Long-Wave Infrared (LWIR) Lasers

Summary:

This project will develop a new line of fiber optics that can improve the utility and effectiveness of laser systems used to detect specific chemical compounds and molecules. Such improvements are important in efforts to prevent the proliferation of weapons of mass destruction (WMD).

Company:

Quantum Signal, LLC
3741 Plaza Drive
Ann Arbor, MI 48108

Title:

Spectral Assisted Moving Vehicle Tracking

Summary:

This project involves understanding non-visible (infraredband) signatures of vehicles and leveraging that information to allow enhanced, robust surveillance from fixed locations, UAVs, and more. The result of this research will be software that will be incorporated into surveillance systems (both military and commercial) that will enhance the safety and security of the United States and its Citizens.

Company:

SVT Associates, Inc.
7620 Executive Drive
Eden Prairie, MN 55344

Title:

High-Detectivity Very-Long-Wavelength Strain-Compensated Type II Superlattice Infrared Photo Detectors

Summary:

This project will produce a strain-compensated type II superlattice structure to improve very-long-wavelength infrared (VLWIR) detection and atomic Hydrogen enhanced growth and surface preparation technique for high performance type II very-long-wavelength photo detectors.

Company:

Space Computer Corporation
12121 Wilshire Boulevard
Suite 910
Los Angeles, CA 90025-1123

Title:

Spectrally-Assisted Tracking of Moving Vehicles

Summary:

Automated tracking of a moving target is problematic when the target is obscured from view or is in close proximity to other similar vehicles. This project will improve tracking performance by using data from an imaging hyperspectral sensor to form higher-confidence matches with future candidate target observations by comparing spectral signatures.

STTR Project**Company:**

Technical Research Associates, Inc.
2800 Woodlawn Drive

Suite 149

Honolulu, HI 96822

Title:

Spectral Assisted Moving Vehicle Tracking

Summary:

Current approaches in the automatically tracking moving vehicles from an overhead platform use techniques that rely on spatial-temporal characteristics coupled with moving object maps and tracking techniques. This project will investigate methods where the spectral observable of the moving vehicles can be useful to improve the efficacy of tracking.

Company:

TelAztec, LLC
15 A Street
Burlington, MA 01803

Title:

Microstructure-Based Anti-Reflection Treatment for Long-Wave Infrared Transmitting Optical Fiber

Summary:

This project will develop a novel, nanotechnology based, series of microstructures that can be designed for control of reflectance or for optical wavelength filtering. The designed microstructures can eliminate the need for fragile thin film type dielectric coatings with a rugged and durable microstructure built directly into the bulk material.

TOPIC: ALTERNATIVE RADIOLOGICAL SOURCES

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Company:

Berkion Technology
109 Columbine Drive
Hercules, CA 94547-1004

Title:

Ultra-Compact Electronic Gamma Source

Summary:

This project will develop a compact, high energy, nonradiological gamma generator to be used in research, well logging for oil exploration and medical applications. This development will improve our homeland security and bring in more research funding and business opportunity to the Contra Costa and San Francisco County Districts of California.

Company:

RadiaBeam Technologies, LLC
13428 Beach Avenue
Marina Del Rey, CA 90292-5624

Title:

Compact, Electronic Blood Irradiator

Summary:

The National Research Council has recommended to congress the elimination of Cs-137 blood irradiators in the US, in order to prevent their use in a "dirty bomb." This project will develop a safe, compact, electronic irradiator to effectively replace such irradiators.

**TOPIC: SIMULATION AND SOFTWARE TOOLS
FOR NONPROLIFERATION R&D**

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Company:

Aries Design Automation, LLC
6157 N. Sheridan Road
Suite 16M
Chicago, IL 60660

Title:

Formal Methods for Robustness Checking of Radiation-Hardened-by-Design Microelectronics

Summary:

The project will develop efficient and scalable mathematically based methods for evaluation of the robustness of radiation-hardened circuits, and automatic generation of recommendations for radiation hardening of specific parts of a circuit. The resulting technology will be of benefit to the DOE, the DOD, all semiconductor companies, as well as companies that develop aerospace electronics, including NASA.

Company:

Visual Editor Consultants
87 Sibert St.
Richland, WA 99354

Title:

Graphical User Interface for Simplified Neutron Transport Calculations

Summary:

With the nuclear threats facing this country, it is essential that analysts have the ability to perform simplified neutron transport calculations. A growing need exists in this country for users that do not have expert knowledge for the specific transport codes being used to have access to the power of a monte carlo analysis to obtain accurate results. This project will create a simple neutron transport calculation tool that can provide fast and accurate source-shield-detector calculations.

TOPIC: SEISMIC SIGNAL ANALYSIS

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Company:

Array Information Technology, Inc.
7474 Greenway Center Drive
Suite 600
Greenbelt, MD 20770

Title:

Tools for Digitization of Historic Seismograms

Summary:

Wide-scale digital recording of earthquakes began in the early 1980s. This project will enable the seismological community to more fully evaluate earthquake source characteristics for large damaging events that were recorded with analog instrumentation starting in the early 1900's, thereby doubling or tripling the current catalog of digital seismograms.

Company:

Retriever Technology, LP
104 1/2 Calle La Pena
Santa Fe, NM 87505

Title:

Use of Raster to Vector Image Analysis Technology to Rapidly and Accurately Digitize Historical Seismograms

Summary:

This project will develop software tools to automatically extract data from historic seismograms. By automating this process it will allow for large repositories of archived data to be analyzed using modern computer-based techniques, providing invaluable assistance to seismic, non-proliferation and mineral extraction studies.

Company:

Rocky Mountain Geophysics, LLC
167 Piedra Loop
Los Alamos, NM 87544

Title:

Development of Software to Digitize Historic Hardcopy Seismograms from Nuclear Explosions

Summary:

Nuclear explosion monitoring operations need to be prepared to provide forensic information for potential future nuclear explosions tested away from known nuclear test sites. This project will develop a software package geared towards the automatic digitization of hardcopy seismograms from historic nuclear explosions detonated under a variety of geophysical conditions.

Company:

Weston Geophysical Corp.
181 Bedford St., Suite 1
Lexington, MA 02420

Title:

A Software Toolbox for Systematic Evaluation of Seismometer-Digitizer System Responses

Summary:

This project will develop a capability to calibrate and improve United States seismic systems used for monitoring foreign nuclear explosive tests.

TOPIC: ADVANCED TECHNOLOGIES FOR ELECTRICITY SYSTEMS

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Company:

Electrical Distribution Design, Inc.
311 Cherokee Drive
Blacksburg, VA 24060

Title:

Model-Based Renewable Resource Risk Assessment Analysis and Simulation

Summary:

This project will use Graph Trace Analysis and Dew software to develop simulation based risk analysis for operation of renewable resources. Dew is currently being used by leading utility, academic and government research groups to develop next generation design and real-time supervisory control for systems that contain millions of components.

STTR Project**Company:**

Signatech Systems
P.O. Box 614
Matthews, NC 28106

Title:

Visualization Technologies for Distribution Systems

Summary:

Expensive outages of the electricity system occur because the distribution operator is not able to digest the vast amounts of data in a timely manner. Operators have desired a more pictorial view but these efforts have been stymied by the lack of proper tools and fast computational methods. This project will develop visualization tools that can provide such capabilities.

TOPIC: ADVANCED ENERGY STORAGE

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Company:

NEI Corporation
400 Apgar Drive
Suite E
Somerset, NJ 08873

Title:

A Low Cost Utility-Scale Flow Battery with a New Chemistry

Summary:

This project will develop a new chemistry for Flow Batteries so that it is highly efficient, has long cycle life, and is low cost and non-toxic. The flow batteries can be used by utilities, in conjunction with green power generation, such as solar, wind turbine and fuel cell.

Company:

TDA Research, Inc.
12345 W. 52nd Avenue
Wheat Ridge, CO 80033-1916

Title:

Liquid Salt Redox Couples for Utility Scale Flow Batteries

Summary:

This project will develop new materials for extremely large installations of redoxflow batteries for battery electricity energy storage (BESS). The materials will allow more energy storage, last longer and thus lower cost.

TOPIC: SEARCH, DISCOVERY, AND COMMUNICATION OF SCIENTIFIC AND TECHNICAL KNOWLEDGE IN DISTRIBUTED SYSTEMS

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Company:

David Wojick
391 Flickertail Lane
Star Tannery, VA 22654-1908

Title:

Deployable Concepts for Discovery of Web Based STEM Education Content and Resources

Summary:

The Federal scientific community is producing vast amounts of educational material that teachers and students cannot find. This project will develop search strategies and new tools to find and collect science education content on the Web.

Company:

Deep Web Technologies, LLC
301 North Guadalupe
Suite 201
Santa Fe, NM 87501

Title:

An Analysis of the Performance Bottlenecks in the Federated Search Information Flow

Summary:

Federated search technology enables information discovery across many information sources in parallel and helps to accelerate knowledge diffusion. This project will identify and attempt to reduce and eliminate bottlenecks that limit the benefits of federated search technology.

Company:

Information International Associates, Inc.
1055 Commerce Park Drive, Suite 110
Oak Ridge, TN 37830-8028

Title:

International Science Education Federated Search Engine

Summary:

This project will create a system to identify English language-based international science education web based resources. Once resources are identified, the project will create a federated search engine to make these resources available via a standard web search paradigm.

Company:

Information International Associates, Inc.
1055 Commerce Park Drive, Suite 110
Oak Ridge, TN 37830-8028

Title:

Web Metrics Analysis for Digital Libraries Based on Scientific and Technical Information

Summary:

This project will create a system that will assist scientific and technical information data curators in managing data more efficiently by using an encompassing Web metrics architecture.

Company:

Intelligent Automation, Inc.
15400 Calhoun Drive
Suite 400
Rockville, MD 20855

Title:

Distributed Mining Tool for Large-Scale DOE Science and Technical Information

Summary:

This project will develop an innovative distributed data mining tool, namely DSTMiner (Distributed Science and Technology Miner), for large-scale science and technical information data. The proposed tool will benefit the knowledge management and access of NIH's PubMed, US patent examination, FDA and CDC's document and data analysis.

TOPIC: IMPROVED CHARACTERIZATION OF WASTE IN TANKS AND ANCILLARY PIPING

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Company:

EIC Laboratories, Inc.
111 Downey Street
Norwood, MA 02062

Title:

Fiber Optically Coupled Raman Telescope for the In Situ Standoff Characterization of Residual Wastes

Summary:

This project will develop a fiber optically coupled Raman probe telescope that will be able to detect and identify chemicals at a standoff distance. The telescope Raman probe will be used as a characterization tool for residual wastes in nuclear waste storage tanks.

STTR Project**Company:**

EIC Laboratories, Inc.
111 Downey Street
Norwood, MA 02062

Title:

An Integrated In Situ Raman and Turbidity Sensor for High Level Waste Tanks

Summary:

This project will develop an integrated Raman/turbidity sensor for in situ characterization of nuclear waste. The sensor will provide chemical characterization of the waste and yield information concerning the amount of suspended particles in the waste.

Company:

Luna Innovations Inc.
1 Riverside Circle

Suite 400
Roanoke, VA 24016

Title:
Ultrasonic In-Situ Characterization of Tank Waste

Summary:
This project will develop ultrasonic measurement technologies to enable the clean-up of liquid waste stored in underground tanks for the DOE without the generation of secondary waste by existing technologies.

Company:
Tanner Research, Inc.
825 S. Myrtle Avenue
Monrovia, CA 91016

Title:
Disposable MEMS-based Raman Micro-spectrometer for Improved Characterization of Waste in Tanks and Ancillary Piping

Summary:
As a legacy of the Cold War, toxic waste from nuclear munitions fabrication has been buried in now aging tanks in dozens of locations across the US. This project will develop a novel miniature chemical sensor to enable safe and successful remediation of this environmental calamity.

TOPIC: ADVANCED TECHNOLOGIES FOR NUCLEAR ENERGY

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Company:
Analysis and Measurement Services Corporation
9111 Cross Park Drive
Building A
Knoxville, TN 37923

Title:
Advanced Techniques for On-Line Condition Monitoring and Diagnostics of Digital Rod Position Indication Systems for Existing and Next Generation Nuclear Power Plants

Summary:
This project will enhance the Digital Rod Position Indication (DRPI) systems of existing and new AP1000 reactors with diagnostic capabilities to provide better rod position information, DRPI coil health, and automated rod drop time measurements. This can reduce reactor trips and reduce refueling outage time.

Company:
Analysis and Measurement Services Corporation
9111 Cross Park Drive
Building A
Knoxville, TN 37923

Title:
On-Line Monitoring Technology for Aging Management and Life Extension of the Advanced Test Reactor (ATR) at Idaho National Laboratory

Summary:
Predictive maintenance and condition monitoring technologies are used in industrial processes to prioritize maintenance activities and focus the maintenance resources to areas where they are most needed. This project will reduce maintenance costs and improve productivity, safety and reliability, by determining the feasibility of existing predictive maintenance and condition monitoring technologies for the Advanced Test Reactor (ATR) at the Idaho National Laboratory (INL).

Company:
Luna Innovations Inc.
1 Riverside Circle
Suite 400
Roanoke, VA 24016

Title:
Fiber Optic Reflector Health Monitoring System

Summary:
This project will develop a technique for in-line health monitoring of nuclear reactor's structural components to support the Gen-IV and Nuclear Hydrogen Initiatives. This system will enable safe operation of these reactors, which in turn will reduce the U.S. dependency on foreign oil while simultaneously reducing emission of green house gasses.

STTR Project

Company:
Polymer Aging Concepts, Inc.
372 River Drive
Dahlonega, GA 30533

Title:
Nanotechnology-Based Condition Monitoring Sensors for Generation Electrical Insulation Systems

Summary:
A new method to detecting aging of electrical insulation will significantly improve availability and lower costs of nuclear power plants by providing sensors that detect degradation of electric insulation in harsh environments, allowing component

replacement before failure. This technology also has health-monitoring applications in automotive, wind turbine and aerospace technologies.